

ARIZONA DEPARTMENT OF TRANSPORTATION

REPORT NUMBER: AZ92-377-II

# CONSTRUCTION REPORT FOR ARIZONA'S SHRP SPS-4 EXPERIMENT

## Appendices

### Prepared by:

W.R. Meier, Jr., Ph.D., P.E.  
Edward J. Elnicky, P.E.  
Western Technologies, Inc.  
P.O. Box 21387  
3737 East Broadway  
Phoenix, Arizona 85036

377-11

August 1992

### Prepared for:

Arizona Department of Transportation  
206 South 17th Avenue  
Phoenix, Arizona 85007  
in cooperation with  
U.S. Department of Transportation  
Federal Highway Administration

The contents of the report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Arizona Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation. Trade or manufacturers' names which may appear herein are cited only because they are considered essential to the objectives of the report. The U.S. Government and The State of Arizona do not endorse products or manufacturers.

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**APPENDIX A**  
**Change Order No. 19**

(2)

**BALL, BALL AND BROSAMER, INC.**

GENERAL ENGINEERING CONTRACTORS  
CALIFORNIA STATE CONTRACTORS  
LICENSE NO. 302008

Job 131  
February 11, 1991

POST OFFICE BOX 100  
DANVILLE, CALIFORNIA 9452  
TELEPHONE (415) 837-023  
TELEX NO. 9103894021

REF:131-02-132

Arizona Department of Transportation  
1540 S. Recker Road  
Mesa, AZ 85206

PLEASE REPLY TO

P.O. Box 870  
Apache Jct., AZ  
85217-0870

Attention: Mr. Michael Loo - Acting Resident Engineer

Subject: Superstition Freeway / Power Rd. - U.S. 80  
Contract # F-028-1-514  
SEALANT RESEARCH TEST SECTION, C.O. #19

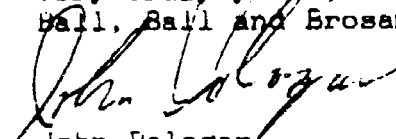
Gentlemen:

We hereby submit our cost proposal for the Sealant Research Test Section. the total cost for Change Order No. 19 is \$25,620.60 Lump Sum. A detailed cost analysis is attached.

Please contact us if you have any questions. Time is of the essence. Our paving progress has already moved into this test area on February 9, 1991.

If you have any questions please contact our field office at (602) 983-5141.

Very truly yours,  
Ball, Ball and Brosamer, Inc.

  
John Pologor  
Project Manager

JP/pc  
cc: Danville  
File job 131  
Enclosure

RECEIVED

FEB 13 1991

AZ DEPT. OF TRANSPN.  
ORG - 4149

③

PROJECT NUMBER: F-020-1-514

BALL, BALL, & BROGANER JOB NUMBER: 131

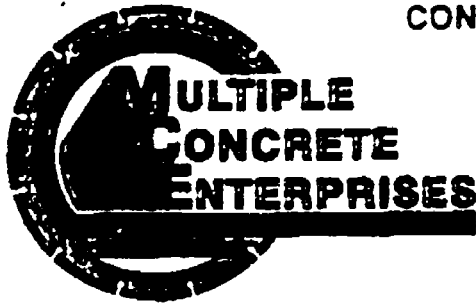
CHANGE ORDER NUMBER: 19

DESCRIPTION: ADDITIONAL COSTS TO PROVIDE AND INSTALL 11 NAME BRAND PRODUCTS IN 24 TEST SECTIONS

DATE: 11-Feb-91

[illegible]

## CONCRETE SAWING AND SEALING



February 7, 1991

John Pologar  
Ball, Ball & Brosamer  
P.O. Box 870  
Apache Jct., AZ 85217-0870

Dear John:

Enclosed you will find the revised change order #19 on the Superstition freeway test sections. Please disregard the others, sent to you previously.

Thanks,

*Var*

Var Stephens

## Proposal

5



P.O. BOX 828

LAYTON, UTAH 84041

PHONE 544-2693 or 355-0189 (SLC)

PROPOSAL SUBMITTED TO Ball, Ball & Brosamer		PHONE	DATE 2-7-91
STREET P.O. Box 870		JOB NAME Superstition Freeway - To	
CITY, STATE AND ZIP CODE Apache Jct., AZ 85217-0870		JOB LOCATION Test Sections	
ARCHITECT C/O John Pologor	DATE OF PLANS	JOB PHONE	

We hereby submit specifications and estimates for:

## CHANGE ORDER #19

To install <sup>9</sup> brand name products in 24 test sections.

Additional material costs to be incurred (see attachments)	\$10,282.00
Additional labor costs to be incurred	3,476.00
Additional Equipment costs to be incurred	1,015.00
Mark up	4,582.00
<b>Total:</b>	<b>\$19,355.00</b>

Estimated 57,300 L/F of joint involved

$$19,355 \div 57,300 \text{ L/F} = .34 \text{ L/F}$$

AN EQUAL OPPORTUNITY EMPLOYER

All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workmen's Compensation Insurance.

Authorized  
SignatureNote: This proposal may be  
withdrawn by us if not accepted within

## Acceptance of Proposal

The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Date of Acceptance:

Signature

Signature



(6)

## Superstition Change Order #19

MATERIALS

Compression Seal D. S. Brown V-687

Approx. 3,000 L/F @ .62 = 1,860.00

Lubricant 10 gal @ 12.00 gal = 120.00

2000 L/F

Compression Seal Elastomer PV687

Approx. 3,000 L/F @ .58 = 1,740.00

Lubricant 10 gal @ 11.80 = 118.00

Freight on Lube 45.00 = 45.00

/ Mobay 960 S.L.

Waste &amp; test 9 gal

✓ Approx. trans 1500' 3/8" x 3/8" 12 gal

✓ Approx. long. 1350' 1/2" x 1/2" 19 gal

Total 40 gal @ \$35.00 1,400.00

Mobay 960 Not Specified

Waste &amp; Test 9 gal

Approx. trans. 1500' 3/8" x 3/8" 12 gal

Approx. long. 1350' 1/2" x 1/2" 19 gal

Total 40 gal @ \$29.00 1,160.00

Dow 890 S.L.

Waste &amp; Test 9 gal

Approx trans. 3,000' 3/16" x 5/16" 6 gal

3,000' 5/15" x 3/8" 20 gal

3,000' 3/8" x 3/8" 23 gal

Approx. long. 8100' 1/2" x 1/2" 116 gal

Total 174 gal (comes in 40 gal drums)

Need 5 drums

200 gal @ \$43.01 8,602.00

Dow 828 S.L.

Waste &amp; test 9 gal

Approx. trans. 3,000' 3/8" x 3/8" 23 gal

Approx. long. 3,700' 1/2" x 1/2" 34 gal

Total 66 gal (2 drums @ 40g. ea.)

80 gal @ \$41.75 3,340.00

(7)

## Dow 888

Waste & test 2400' 3/8" x 3/8" 9 gal  
 Approx. trans. 3,000' 3/8" x 3/8" 23 gal  
 Approx. long. 2,700' 1/2" x 1/2" 34 gal  
 Total 66 gal (2 drums @ 40 g. ea.)  
 80 gal @ \$29.00 2,320.00

## Crafco 444 hot pour

Waste & test 15 gal  
 Approx. trans. 3,000' 3/8" x 3/8" 23 gal (17.00)  
 Approx. long. 2,700' 1/2" x 1/2" 39 gal (5.00)  
 Total 77 gal @ \$ 7.00 539.00

Flush oil needed 10 gal @ \$12.00 120.00

## Crafco 221 hot pour

Waste & test 15 gal  
 Approx. trans. 3,000' 3/8" x 3/8" 23 gal (3.50)  
 Approx. long. 2,700' 1/2" x 1/2" 39 gal (2.50)  
 Total 77 gal @ \$ 3.50 270.00

Flush oil needed  $\frac{1400}{5000} \times \frac{1}{10} \times 5.21$  10 gal @ \$12.00 120.00

## Crafco Silicone S.L.

Waste & Test 9 gal  
 Approx. trans. 1,500' 3/8" x 5/16" 10 gal  
 Approx. long. 1,350' 1/2" x 1/2" 19 gal  
 Total 38 gal (1 drum = 40 gal.)  
 40 gal @ \$29.00 1,160.00

## Crafco Silicone Non-Sag

Waste & Test 9 gal  
 Approx. trans. 1,500' 3/8" x 3/8" 12 gal  
 Approx. long. 1,350' 1/2" x 1/2" 19 gal  
 Total 40 gal @ \$28.00 1,120.00

\*No extra costs in sawing or backer-rod will be incurred.

Total material costs this change order: \$24,034.00  
 Less materials already bid in (est. 57,300 L/F) -13,752.00

Additional material costs \$10,282.00

(8)

LABOR

1. Flushing machines between products & changing barrells  
    5 man crew 1/2 hr. down time per product change (24 changes)  
    60 man hours @ \$14.75 \$ 885.00
2. Transport materials to job site  
    2 men 8 hrs. = 16 hrs. @ \$14.75 236.00
3. Changing of blades on saws for width & depth variances  
    3 man crew 8 hrs = 24 total down-time @ \$14.75 354.00
4. Operator for power sweeper specified  
    1 man 8 hrs. x 2 days = 16 hrs. @ \$18.50 296.00
5. Additional cleaning labor required to remove laitence broomed  
    into joints after waterblasting operation, by brooming of the  
    surface.  
    3 men 8 hrs. x 3 days = 72 hrs @ \$14.75 1,062.00

Direct labor costs	2,833.00
Labor overhead costs	643.00
Total increased labor costs	3,476.00

EQUIPMENT

Truck & Compressor (additional cleaning)	N/C
Silicone Truck & Pump	N/C
Hot pour truck & machine	N/C
Compression joint machine rental M.C.E.	565.00
Power broom rental	450.00
Total equipment costs	1,015.00



BALL, BALL AND BROSAMER, INC.

GENERAL ENGINEERING CONTRACTORS  
CALIFORNIA STATE CONTRACTORS  
LICENSE NO. 302008

Job 131  
March 1, 1991

POST OFFICE BOX 100  
DANVILLE, CALIFORNIA 9452  
TELEPHONE 415/ 837 023  
TELEX NO 910389402

REF:131-03-143

Arizona Department of Transportation  
1540 S. Recker Road  
Mesa, AZ 85206

RECEIVED

MAR 4 1991  
AZ DEPT. OF TRANSPORTATION  
ORG - 4149

PLEASE REPLY TO

P.O. Box 870  
Apache Junction  
85217-0870

Attention: Mr. Michael Loo - Acting Resident Engineer  
Subject: Superstition Freeway / Power Rd. - U.S. 60  
Contract # F-028-1-514  
SEALANT RESEACH TEST SECTION

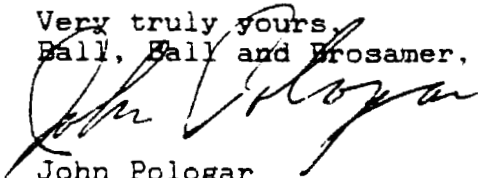
Gentlemen:

We hereby submit our revised proposal for the Sealant Research Test Section. Our total price for this cost Change Order is \$12,964.51 lump sum.

Please expedite immediate approval to avoid delaying progress on the project. We are presently trying to work around the test area with our subsequent operations (e.g curb grade, median trimming) but sealing of this area is becoming immediately imperative.

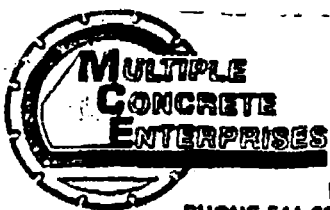
If you have any questions please contact our field office at (602) 983-5141.

Very truly yours,  
Ball, Ball and Brosamer, Inc.

  
John Pologar  
Project Manager

JP/pc  
cc: Danville  
File job 131  
Enclosure

ATTACHMENT NO. \_\_\_\_\_  
To accompany CHANGE ORDER \_\_\_\_\_



P.O. BOX 828  
LAYTON, UTAH 84041  
PHONE 544-2693 or 355-0189 (SLC)

PROPOSAL SUBMITTED TO Ball, Ball & Brosamer	PHONE	DATE 2-7-91
STREET P.O. Box 870	JOB NAME Superstition Freeway -	
CITY, STATE AND ZIP CODE Apache Jct., AZ 85217-0870	JOB LOCATION Test Sections	
ARCHITECT C/O John Pologar	DATE OF PLANS	JOB PHONE

We hereby submit specifications and estimates for:

### CHANGE ORDER #19

To install 11 brand name products in 24 test sections.

Additional material costs to be incurred 8212.00 ~~\$10,282.00~~  
(see attachments)

Additional labor costs to be incurred 2751.00 ~~3,476.00~~

Additional Equipment costs to be incurred 585.00 ~~1,015.00~~

Mark up 1632.00 ~~4,582.00~~

Total: 13,190.00 ~~\$19,355.00~~

less deduction ~~3396.00~~  
\$9794.00

Estimated <sup>56,900</sup> ~~57,300~~ L/F of joint involved

$19,355 \div 57,300 \text{ L/F} = .34 \text{ L/F}$

ATTACHMENT NO. \_\_\_\_\_

To accompany CHANGE ORDER \_\_\_\_\_

### AN EQUAL OPPORTUNITY EMPLOYER

All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be excluded only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workmen's Compensation insurance.

Authorized  
Signature \_\_\_\_\_

Note: This proposal may be  
withdrawn by us if not accepted within \_\_\_\_\_ days.

**Acceptance of Proposal** —The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Signature \_\_\_\_\_

Signature \_\_\_\_\_

Date of Acceptance: \_\_\_\_\_

# Superstition Change Order #19

## MATERIALS

*\*Note #1 Delete material completely.*

Compression Seal D. S. Brown V-687

Approx. 3,000 L/F @ .62 =

~~1,860.00~~ 0

Lubricant 10 gal @ 12.00 gal =

~~120.00~~ 0

Compression Seal Elastomer PV687

Approx. 3,000 L/F @ .58 =

1,740.00

Lubricant 10 gal @ 11.80 =

118.00

Freight on Lube 45.00 =

45.00

Mobay 960 S.L.

Waste & test 9 gal

Approx. trans 1500' 3/8" x 3/8" 12 gal

Approx. long. 1350' 1/2" x 1/2" 19 gal

Total 40 gal @ \$35.00 1,400.00

Mobay 960

*\*Note #2 change the product to S.L.*

Waste & Test 9 gal

Approx. trans. 1500' 3/8" x 3/8" 12 gal

Approx. long. 1350' 1/2" x 1/2" 19 gal

Total 40 gal @ ~~\$29.00~~ <sup>\$35.00</sup> 1,400.00

Dow 890 S.L.

Waste & Test 9 gal

Approx trans. 3,000' 3/16" x 5/16" 6 gal

3,000' 5/15" x 3/8" 20 gal

3,000' 3/8" x 3/8" 23 gal

Approx. long. 8100' 1/2" x 1/2" 116 gal

Total 174 gal (comes in 40 gal drums)

Need 5 drums

200 gal @ \$43.01 8,602.00

Dow 888 S.L.

Waste & test 9 gal

Approx. trans. 3,000' 3/8" x 3/8" 23 gal

Approx. long. 3,700' 1/2" x 1/2" 34 gal

Total 66 gal (2 drums @ 40g. ea.)

80 gal @ \$41.75 3,340.00

**Dow 888**

Waste & test	9 gal		
Approx. trans. 3,000' 3/8" x 3/8"	23 gal		
Approx. long. 2,700' 1/2" x 1/2"	34 gal		
<b>Total</b>	<b>66 gal</b>	<b>(2 drums @ 40 g. ea.)</b>	
	80 gal	@ \$29.00	2,320.00

**Crafco 444 hot pour**

Waste & test	15 gal		
Approx. trans. 3,000' 3/8" x 3/8"	23 gal		
Approx. long. 2,700' 1/2" x 1/2"	39 gal		
<b>Total</b>	<b>77 gal</b>	<b>@ \$ 7.00</b>	<b>539.00</b>

Flush oil needed	10 gal	@ \$12.00	120.00
------------------	--------	-----------	--------

**Crafco 221 hot pour**

Waste & test	15 gal		
Approx. trans. 3,000' 3/8" x 3/8"	23 gal		
Approx. long. 2,700' 1/2" x 1/2"	39 gal		
<b>Total</b>	<b>77 gal</b>	<b>@ \$ 3.50</b>	<b>270.00</b>

Flush oil needed	10 gal	@ \$12.00	120.00
------------------	--------	-----------	--------

**Crafco Silicone S.L.**

Waste & Test	9 gal		
Approx. trans. 1,500' 3/8" x 5/16"	10 gal		
Approx. long. 1,350' 1/2" x 1/2"	19 gal		
<b>Total</b>	<b>38 gal</b>	<b>(1 drum = 40 gal.)</b>	
	40 gal	@ \$29.00	1,160.00

**Crafco Silicone Non-Sag \*Note #2 change this product to S.L.**

Waste & Test	9 gal		
Approx. trans. 1,500' 3/8" x 3/8"	12 gal		
Approx. long. 1,350' 1/2" x 1/2"	19 gal	\$29.00	\$160.00
<b>Total</b>	<b>40 gal</b>	<del>@ \$28.00</del>	<del>1,120.00</del>

\*No extra costs in sawing or backer-rod will be incurred.

Total material costs this change order:	\$24,034.00	#22,334.00
Less materials already bid in (est. 5429 gal. @ 26.00 L/F)	<del>13,752.00</del>	<del>14,092.00</del>

note #3 original purchase of silicone was purchased as truckload quantities at 26.00 per gal. and freight was F.O.B. job site (free)

Additional material costs	\$10,282.00	#8,242.00
---------------------------	-------------	-----------

## LABOR

1. Flushing machines between products & changing barrells  
 5 man crew 1/2 hr. down time per product change (24 changes)  
~~60~~<sup>40</sup> man hours @ \$14.75 ~~\$ 885.00~~  
\$ 590.00
2. Transport materials to job site  
 2 men 8 hrs. = 16 hrs. @ \$14.75 236.00
3. Changing of blades on saws for width & depth variances  
 3 man crew 8 hrs = 24 total down time @ \$14.75 354.00
4. Operator for power sweeper specified  
~~1 man 8 hrs. x 2 days = 16 hrs. @ \$18.50~~ ~~296.00~~ 0  
*Deleted*
5. Additional cleaning labor required to remove laitence broomed  
 into joints after waterblasting operation, by brooming of the  
 surface.  
 3 men 8 hrs. x 3 days = 72 hrs @ \$14.75 1,062.00

\* *Note #4 - These joints are already being done on by const. traffic because they have been left uncured already. By the time the material is here we will have to dry saw and extensively re clean the joints.*

Direct labor costs	<del>2,833.00</del>	<del>2242.00</del>
Labor overhead costs	<del>43.00</del>	<del>509.00</del>
Total increased labor costs	<del>3,476.00</del>	<del>2751.00</del>

F.R.A. 265%  
 F.U.T.A. 80%  
 S.U.T.A. 124%  
 Limb. Ins. 4.50%  
 Work Comp 8.40%  
 } 22.69%

## EQUIPMENT

Truck & Compressor (additional cleaning)	N/C
Silicone Truck & Pump	N/C
Hot pour truck & machine	N/C
Compression joint machine rental M.C.E.	565.00
<del>Power broom rental</del> <i>Deleted</i>	<del>450.00</del>
<b>Total equipment costs</b>	<b><del>1,015.00</del> 565.00</b>

*Note #6 We are still in need of this machine to install the Elastom Compression seal specified.  
 (or is A.D.O.T. going to have their competition, D.S. Brown install their product for them?)*

ATTACHMENT NO. \_\_\_\_\_  
 To accompany CHANGE ORDER \_\_\_\_\_



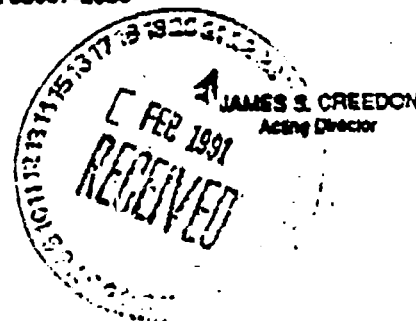


## ARIZONA DEPARTMENT OF TRANSPORTATION

206 South Seventeenth Avenue Phoenix, Arizona 85007-2830

ROSE MOFFORD  
Governor

February 22, 1991

Ball, Ball and Brosamer, Inc.  
P. O. Box 870  
Apache Junction, Arizona 85217-0870

Attn: JOHN POLOGAR

Re: Project P-028-1-814/H045304C  
SUPERSTITION FREEWAY  
(Power Road to US 80) Phase III  
SEALANT RESEARCH TEST SECTION

Upon review of your submitted cost analysis, it became evident that clarifications are required. Each Experimental Zone should contain the same products. Two sealants specified in Zone No. 2 were incorrect. Test Section No. 18 should be sealed with Mobay Dapsilone Self Leveling and Test Section No. 20 should be sealed with Craftco Silicone Self Leveling. *\* see note #2 materials cost sheet*

With regards to the cost analysis the following items should be also be considered. As previously discussed, the D.S. Brown *\* see note #1 materials cost sheet* compression seal will be placed by the manufacturer. In addition, the originally specified power sweeping requirement (Item No. 2 - January 22, 1991 letter) shall be deleted.

The following is the Department's evaluation of the remaining costs.

Amount of Mobay 960 not used (per Multiple Concrete Ent.)

<del>387 gallons @ 329.00 =</del>	<del>127,023.00</del>
-----------------------------------	-----------------------

*\* see note #3 materials cost sheet*

Total Cost of New Product (per Multiple Concrete Ent.)

<del>-324,001.00</del>
------------------------

MATERIALS COSTS

<del>-324,001.00</del>
------------------------

<del>-17,023.00</del>
-----------------------

<del>-7,008.00</del>
----------------------

ATTACHMENT NO. \_\_\_\_\_

To accompany CHANGE ORDER \_\_\_\_\_



February 22, 1991

LABOR COSTS

1. 8 man crew (1/2 ea.) per product change (16 changes).  
OK. 40 hr. @ \$14.75 = 590.00
2. <sup>OK</sup> Transport Materials  
2 men 8 hrs. = 16 hr. @ \$14.75 = 236.00
3. <sup>OK</sup> Change Blades  
3 men crew 8 hrs. = 24 hrs. @ \$14.75 = 354.00
4. <sup>OK</sup> Delete Power Sweeper -0-
5. Delete \* See Note #4 labor cost sheet -0- ~~1062.~~

Direct Labor 31,180.00 ~~\$2245.00~~  
Labor OH&P @ 15% 22.69% ~~177.00~~ ~~\$509.00~~  
*see Note #5 Labor cost sheet* Total Labor Costs 31,357.00 ~~\$2751.00~~

EQUIPMENT COSTS

~~0~~ \$565.00

There are no additional equipment Cost due to deletion of sweeping and placement of compression seal by manufacturer.

*see Note #6 Equip. cost sheet*

ADOT CREDIT

The submitted addendum indicated Lineal foot prices of \$0.16 and \$0.28 for joint widening and sealing respectively. It is unclear how these prices were derived. Please provide further explanation. However, if we assume these numbers to be accurate the Department should receive the following credit.

1. Deletion of Tran. widening (Test Sec. 3.9.13.17)  
4 @ 1500' / Sec. = 6000'  
6000' x \$0.16 = \$ 960.00 *OK*
2. Deletion of Trans. joint sealing (Test Sec. 1.3 ~~5.14.17.22~~)  
4 @ 1500' / Sec. = 6000' ~~6000' x \$0.28 = \$1680.00~~  
9000' x \$0.28 = ~~\$2,520.00~~ ~~\$1680.00~~ *as stated* *as stated*
3. Deletion of Longitudinal joint widening (Test Sec. 3.9.13.17)  
4 @ 1500' / Sec. = 6000'  
6000' x \$0.16 = ~~\$ 960.00~~ ~~0~~ *ALREADY* *WIDENED*

*Test sec. 5 + 22 still like contractor's product not O.S. & remove*

*This item already done*

Ball, Ball & Brosamer  
Project F 028-1-514

-3-

February 22, 1991

4. Deletion of longitudinal joint sealing (Test Sec. 3.17)  
2 @ <sup>1/350</sup> 1600' / Sec. = 3000'  
~~3000'~~ x \$0.28 = ~~840.00~~ 756.00  
<sub>2760'</sub>  
~~38,280.00~~ 3376.00

The final summary of proposed costs is as follows:

Materials Costs	<del>47,088.00</del>	+ \$8242.00
Labor Costs	<del>1,887.00</del>	+ \$2751.00
Equipment Costs	<del>0.00</del>	+ \$565.00
ADOT Credit	<del>-38,280.00</del>	- \$3376.00
TOTAL	<del>43,088.00</del>	\$8162.00
	Mark-up 20%	\$1632.00
		\$9794.00

Should you have any questions, please call me at 396-8383.

Sincerely,

*Michael V. Loo*

MICHAEL V. LOO  
Acting Resident Engineer

MVL/ma  
cc: Harrington  
file

ATTACHMENT NO. \_\_\_\_\_  
To accompany CHANGE ORDER \_\_\_\_\_

PROJECT NUMBER: F-02B-1-314 BALL, BALL, & BROSAHER JOB NUMBER: 131 CHANGE ORDER NUMBER: 19 REV

DESCRIPTION: ADDITIONAL COSTS TO PROVIDE AND INSTALL 11 NAME BRAND PRODUCTS IN 24 TEST SECTIONS DATE: 11-Feb-91

DESCRIPTION	QUANT/ UNIT	UNIT/ PRICE	MATERIAL EXTENDED	LABOR RATE	LABOR EXTENDED	EQUIP. RATE	EQUIPMENT EXTENDED	SUBCONTRACT TOTALS	TOTALS
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MATERIAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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BALL, BALL AND BROSAMER, INC.

GENERAL ENGINEERING CONTRACTORS  
CALIFORNIA STATE CONTRACTORS  
LICENSE NO. 302008

POST OFFICE BOX 1007  
DANVILLE, CALIFORNIA 94526  
TELEPHONE (415) 837 0231  
TELEX NO. 9103894028

Job 131  
March 18, 1991

RECEIVED

MAR 21 1991

AZ DEPT. OF TRANSPORTN.  
ORG-4149

PLEASE REPLY TO

REF:131-03-155

Arizona Department of Transportation  
1540 S. Recker Road  
Mesa, AZ 85206

P.O. Box 870  
Apache Jct., AZ  
85217-0870

Attention: Mr. Michael Loo - Acting Resident Engineer

Subject: Superstition Freeway / Power Rd. - U.S. 60  
Contract # F-028-1-514  
COST ANALYSIS FOR SEALANT TEST SECTION

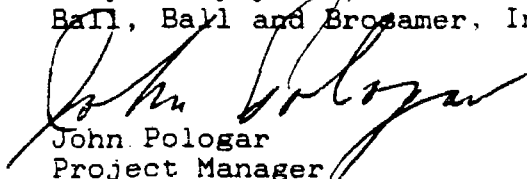
Gentlemen:

We herewith submit our revised cost analysis for the sealant test section. Our total price for this change order is \$14,011.52. Per ADOT'S direction, the materials have been ordered and we stand ready to start work.

Please approve this cost analysis to prevent any delay to the project.

If you have any questions please contact our field office at (602) 983-5141.

Very truly yours,  
Ball, Ball and Brosamer, Inc.

  
John Pologor  
Project Manager

JP/cr  
cc: Danville  
File job 131

CHANGE ORDER NUMBER: 19

DESCRIPTION: SEALANT RESEARCH TEST SECTION REV 4

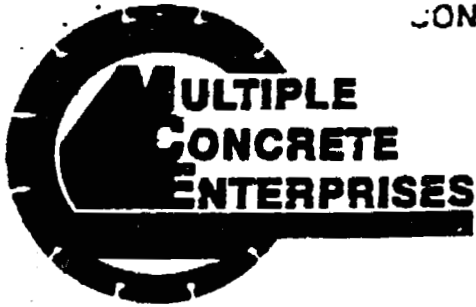
DATE: 21-Jan-91

[illegible]

GRAND TOTAL	914,011.52
UNIT PRICE	914,011.52

COI98EY4.WK1

UNIT PRICE \$14,011.52



## CONCRETE SAWING AND SEALING

March 15, 1991

John Pologar  
Ball, Ball & Brosamer  
P.O. Box 870  
Apache Jct., AZ 85217-0870

Dear John:

In response to A.D.O.T. Revision #4 on change order #19 Test Sections.

	<u>M.C.E.</u>	<u>A.D.O.T.</u>
Additional material costs	10,222.00	10,222.00

(Including D.S. Brown Compression Seal)

2. There was no decrease in the credit of Mobay product presently being used. Based on the actual material footage production per gallon multiplied by the L/P of joint applicable equals 542 gallons at our purchase price on truck load quantities of \$26.00 per gallon the total credit to A.D.O.T. is \$14,092.00. I am not aware of where A.D.O.T. came up with the quantity of 587 gallon for credit.

3. A.D.O.T. states there has not been traffic on the P.C.C.P. in the areas of the test sections. This is not a factual statement and all that is required is to drive down and look at the joints. Unless A.D.O.T. or S.H.A.R.P.S. people would rather we seal contaminated concrete joints the additional cleaning charges must stand.

	<u>M.C.E.</u>	<u>A.D.O.T.</u>
Labor	2,751.00	1,447.74

4. The compression joint machine is unavailable at any rental yards and can only be purchased from the material manufacturer. M.C.E. owns the only power machine in the western states and D.S. Brown only rents their machine to reputable firms with a technician and then only on large orders.

ATTACHMENT NO. \_\_\_\_\_  
To accompany CHANGE ORDER

D.S. Brown has faxed a copy of what they would rent their machine for, so as A.D.O.T. can have a cost comparison. (See attachment #1)

5 day estimated at \$60.00 per day = \$300.00  
Round trip transport costs to bring machine from McCarren Airport, Las Vegas, Nevada - Superstition project, Phoenix, Arizona. \$265.00

Total cost for machine \$565.00

A.D.O.T. must understand the inconveniences and expenses incurred to perform such a small amount of sealant changes. If we were comparing large quantities of each type, the costs would come down considerably. (I/E/ example) Monthly rates rather than daily rates. freight prices eliminated, etc.

5. Cost analysis for	A. Widening joints	@	.16 L/F
	B. Sealing Joints	@	.27 L/f

A. Widening joints	Diamond blades	<del>.85</del> .045
	Labor (Incl. Overhead)	.06 .66
	Equipment & Fuel costs	<u>.13</u> .015
		.16 L/F

B. Sealing joints	Silicone	.205
	Backer-rod	.015
	Labor (Incl overhead)	.048
	Equipment & Fuel costs	<u>.012</u>
		.28 L/F

\*Again note these costs are based on very large quantities (I/E over 1,000,000 L/F of joint)

Summary of revised costs:	Material	\$10,222.00
	Labor	2,751.00
	Equipment	<u>565.00</u>
	Subtotal	\$13,538.00
	Mark up 15%	<u>2,030.70</u>
	Subtotal	\$15,568.70
	Less deduct to A.D.O.T.	<u>3,396.00</u>

Total cost of change order \$12,172.70





# THE D. S. BROWN COMPANY

P. O. BOX 158/331 E. CHERRY ST.  
NORTH BALTIMORE, OHIO, USA 46872

March 15, 1991

Multiple Concrete Corp.  
1680 W. Gordon Ave.  
PO Box 628  
Layton, UT 84041

RE: Rental sales of the Delastall Autoinstaller

Dear Wynn:

It is very uncommon to find the Delastall for rent. The D.S. Brown Company rents the Delastall only on special projects. But in the event we would rent the machine, the cost would be approximately \$75.00/day, plus freight expenses to and from the jobsite. The rent on a monthly basis would be slightly less, in the area of \$1000.00/month. Not included in the rent is clean-up solvents or spare parts.

Hopefully this answers your question. If I can be of any further help, please call me.

Best regards,

Edwin Bechstein  
Product Manager

EB/rg

ATTACHMENT NO. \_\_\_\_\_  
To accompany CHANGE ORDER \_\_\_\_\_

## **APPENDIX B**

### **Joint Sealant Product Literature**



6975 W. CRAFTCO WAY • CHANDLER, AZ 85226 • 602-276-0406  
WATS (800) 528-8242 • FAX (602) 961-0513

PRODUCT DATA SHEET  
**ROADSAVER SILICONE SL SEALANT**

PART NO. 34903

January 1991

READ BEFORE USING THIS PRODUCT

**GENERAL**

Crafco Self-Leveling Highway Silicone Sealant is a low modulus silicone which offers the performance and durability characteristics of conventional silicone with the ease of installation of self-leveling materials. Crafco Self-Leveling Highway Silicone can be used in all highway horizontal joint applications in which conventional non-sag silicones have been used. Self-Leveling Highway Silicone is applied to concrete joints using conventional silicone installation techniques without the use of tooling. The leveling characteristics insure that the required joint wetting for development of appropriate adhesion occurs.

**SPECIFICATION  
CONFORMANCE**

The recommended specification for Roadsaver Silicone SL is:

**Uncured Properties**

**Specification Limits**

Extrusion Rate (ASTM C603)	10-sec. max..
or	
Extrusion Rate (ASTM Mil 8802)	500 g/min. minimum
Skinover Time (1)	4 hours max.
Leveling at 77F (ASTM C639)	Pass

**Cured Properties**

**Specification Limits**

Through Cure Time, 1/2" x 1/2" (1)	21 day max.
Elongation (ASTM D412-C) (2)	700% min.
Stress at 150% (ASTM D412-C) (2)	30 psi max.
Shore OO Hardness (ASTM D2240) (2)	40-80
Specific Gravity (ASTM D792-A) (2)	1.10-1.40
Adhesion to Concrete (Mil 8802) (2)	20 pli min.
Bond and Movement Capability (3)	
100% movement at 0 F	Pass 10 cycles
Accelerated Weathering (ASTM C793) (2)	Pass 5,000 hours
Bond to Mortar (AASHTO T132) (2)	50 psi minimum

- NOTES: (1) Tested at 77 +/- 3F and 50 +/- 5% humidity.  
(2) Specimens shall be obtained from 1/8 inch thickness sheets of material which was cured for 21 days at 77 +/- 3F and 50 +/- 5% relative humidity.  
(3) Specimens cured for 21 days at 77 +/- 3F and 50 +/- 5% humidity followed by 7 days of immersion in distilled water prior to extending 100% at 1/8 inch per hour in accordance with ASTM C719.

**APPLICATION:**

The unit weight is 10.7 pounds per gallon. One gallon will seal 150 feet of 1/2 inch wide by 1/4 inch deep joint. For detailed application procedures, refer to the Crafco Application Instructions for Self-Leveling Silicone Sealant.

**PACKAGING:**

Roadsaver Silicone SL Sealant is packaged in plastic lined open head 55 gallon drums which contain 45 gallons of material. Additionally, for small applications the sealant is available in plastic gallon pails and standard caulking tubes.

**AVAILABILITY  
AND COST:**

For prices and ordering information for Crafco Roadsaver Silicone Sealant, contract your local Crafco distributor or Crafco, Inc.

RECEIVED

MAR 31 1992

WESTERN TECHNOLOGIES, INC.  
PHOENIX, ARIZONA



6975 W. CRAFCO WAY • CHANDLER, AZ 85226  
1-800-528-8242 • (602) 276-0406 • FAX (602) 961-0513

## PRODUCT DATA SHEET

# SUPERSEAL 444

## SEALANT

PART NO. 34850

JANUARY 1989

### READ BEFORE USING THIS PRODUCT

**GENERAL:** CRAFCO Superseal 444 sealant is a high quality, hot-applied sealant intended for use in sealing joints in portland cement concrete pavements. The sealant is specifically formulated and produced to meet requirements of ASTM D3406-85 and AASHTO M282.

Superseal 444 is supplied in liquid form in 5 gallon pails. Being initially liquid, Superseal 444 is much easier to handle during application than solid hot-poured sealant types.

During application, Superseal 444 is simply poured into the melter applicator unit, heated to application temperature, and applied to prepared joints. At application temperature, Superseal 444 is self leveling and produces uniform and neat sealed joints. After application and cooling, Superseal 444 forms a tough, resilient, well bonded seal for concrete pavement joints.

Superseal 444 is formulated to be used only as a sealant for portland cement concrete pavements. It is *not* to be used in asphalt concrete pavements.

### PHYSICAL PROPERTIES AND SPECIFICATION CONFORMANCE:

CrafcO Superseal 444 meets all requirements of ASTM D3406-85, "Specification for Joint Sealant, Hot-Poured, Elastomeric Type, For Portland Cement Concrete Pavements" and AASHTO M282. Typical test results for the sealant are:

Test	Typical Superseal 444 Results*	AASHTO M282 ASTM D3406-85 Spec. Limits
Cone Penetration, 77°F	1.10 cm	1.30 cm max.
Flow, 150°F, 72 hrs.	No Flow	No Flow
Bond, 0 F, 50% ext.	No Separations	No Separations
	3 cycles	3 cycles
Water Immersed Bond	No Separations	No Separations
	3 cycles	3 cycles
Resilience, 77°F	65%	60% min.
Aged Resilience, 77°F	65%	60% min.
Artificial Weathering Test	Pass	See Below**
Tensile Adhesion	700%	500% min.
Flexibility	Pass	Pass
Recommended Pour Temperature	260°F	—
Safe Heating Temperature	280°F	As Specified

\*\* The joint sealant shall not flow, show tackiness, presence of an oil-like film or reversion to a mastic-like substance, formation of surface blisters either intact or broken, form internal voids, surface crazing or cracking, or hardening or loss of resilient, rubber-like properties. Evidence of physical change in the surface of the material by visual and tactile examination shall constitute failure of this test.

Additional properties of Superseal 444 are:

Test	Superseal 444 Result*
Brookfield Viscosity at 280°F (ASTM D3235)	40 Poise
Unit Weight at 60°F	10.5 lbs/gallon
Coverage 1/2 x 1" joint	27.3 lbs per 100 ft

\*Typical Superseal 444 results shall not be used as specification limits.

From  
260° F  
Spec. Limit 250°F  
Safe when  
230°F

**APPLICATION:** For detailed application procedures refer to the CrafcO Application Instructions for Superseal 444 sealant.

**PACKAGING:** The sealant is packaged in 5 gallon pails with 48 pails per pallet. Sealant may be packaged in pails with a polyethylene liner on request.

**AVAILABILITY AND COST:** For prices and availability of CrafcO Superseal 444, contact your local CrafcO Distributor or CrafcO, Inc.

**WARRANTY:** CRAFCO, Inc. warrants that CRAFCO sealants meet applicable ASTM, AASHTO, Federal or State specifications at time of shipment. Techniques used for the preparation of the cracks and joints prior to sealing are beyond our control as are the use and application of the sealants; therefore, CRAFCO shall not be responsible for improperly applied or misused sealants.

Remedies against CRAFCO, INC., as agreed to by CrafcO, are limited to replacing non-conforming product or refund (full or partial) of purchase price from CRAFCO, INC. All claims for breach of this warranty must be made within three (3) months of the date of use or twelve (12) months from the date of delivery by CRAFCO, INC. whichever is earlier.

There shall be no other warranties expressed or implied. For optimum performance, follow CRAFCO recommendations for sealant installation.



6875 W. CRAFCO WAY • CHANDLER, AZ 85226 • 602/276-0406  
WATS (800) 528-8242 • FAX (602) 961-0513

## PRODUCT DATA SHEET ROADSAVER 221 SEALANT

PART NO. 34221

January 1991

READ BEFORE USING THIS PRODUCT

### GENERAL

CRAFCO RoadSaver 221 sealant is a single component, high quality hot-pour petroleum based pavement crack and joint sealant which is specially formulated to meet all requirements of ASTM D3405 and AASHTO M301. The sealant exceeds requirements of ASTM D1190, AASHTO M173 and Federal Specification SS-S-164. RoadSaver 221 is supplied in solid block form which is easily melted. When properly applied, RoadSaver 221 will form a long lasting resilient seal which is flexible and extensible at sub-zero temperatures and which resists tracking at hot summer temperatures. RoadSaver 221, when melted, can be applied to pavement cracks and joints using either pressure feed melter applicator units or pour pots. RoadSaver 221 is ideally suited for sealing cracks and joints in both asphalt and portland cement concrete pavements.

### SPECIFICATION CONFORMANCE

Specification limits for RoadSaver 221 when tested for conformance with ASTM D3405 are:

Test	ASTM D3405 Spec. Limits
Cone Penetration, 77F	90 max.
Flow, 140F	3mm max.
Resilience, 77F	60% min.
Bond, -20F, 50% ext.	Pass 3 cycles
Bond, 0F, 100% ext.	Pass 3 cycles
Asphalt Compatibility	Compatible
Recommend Pour Temperature	380F
Safe Heating Temperature	410F

### APPLICATION

The unit weight of CrafcO RoadSaver 221 is 10.0 lbs. per gallon at 60F. 13.0 lbs. of material is required to fill 100 feet of a 1/2" x 1/2" joint. For detailed application procedures refer to the CRAFCO Application Instructions for RoadSaver 221 sealant.

### PACKAGING

Packaging of CrafcO sealants consists of individual boxes of sealants which are palletized into shipping units each weighing approximately 2400 pounds. Sealants are sold by the net pallet weight. Standard packaging consists of boxes containing approximately 50 pounds of sealant. Sealant may be ordered in boxes weighing approximately 50 pounds with two compartments each containing approximately 25 pounds of sealant. All boxes contain a non-adherent film for easy sealant removal. Several alternate packaging types are available on a special order basis.

### AVAILABILITY AND COST

For prices and to order RoadSaver 221, contact your local CRAFCO Distributor or CrafcO, Inc.

### WARRANTY

CRAFCO, Inc. warrants that CRAFCO sealants meet applicable ASTM, AASHTO, Federal or State specifications at time of shipment. Techniques used for the preparation of the cracks and joints prior to sealing are beyond our control as are the use and application of the sealants; therefore, CrafcO shall not be responsible for improperly applied or misused sealants.

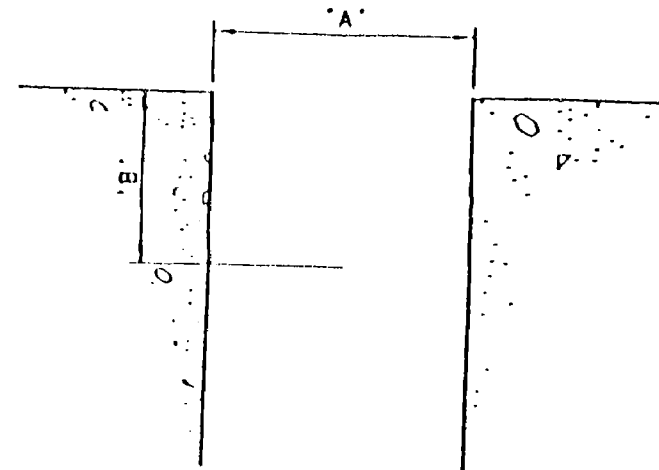
# **CRAFCO INC.**

Remedies against Crafcro, Inc., as agreed to by Crafcro, are limited to replacing nonconforming product or refund (full or partial) of purchase price from Crafcro, Inc. All claims for breach of this warranty must be made within three (3) months of the date of use or twelve (12) months from the date of delivery by Crafcro, Inc. whichever is earlier.

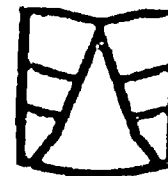
There shall be no other warranties expressed or implied. For optimum performance, follow Crafcro recommendations for sealant installation.

# DIMENSION TABLE

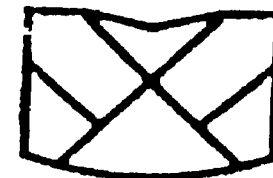
MODEL NUMBER	MOVEMENT	SEAL SIZE		GROOVE WIDTH		SEAL DEPTH B	INSTALLATION WIDTH
		WIDTH	HEIGHT	MIN. A	MAX. A		
WB-437	.207"	7/16"	9/16"	.153"	.360"	1"	1/4"
WB-562	.253"	8/16"	11/16"	.197"	.450"	1 1/8"	5/16"
WB-587	.310"	11/16"	11/16"	.240"	.550"	1 1/4"	3/8"
WB-812	.366"	13/16"	7/8"	.284"	.650"	1 1/2"	7/16"
WB-1000	.450"	1"	1 1/8"	.350"	.800"	1 3/4"	1/2"
WB-1250	.563"	1 1/4"	1 1/8"	.437"	1.00"	2"	5/8"
WC-1250	.563"	1 1/4"	1 5/32"	.437"	1.00"	2"	5/8"
WC-1625	.732"	1 5/8"	1 5/32"	.668"	1.30"	2"	3/4"
WC-1750	.919"	1 3/4"	1 1/32"	.860"	1.487"	2"	7/8"
WC-2000	.975"	2"	2 1/32"	.925"	1.600"	2"	1"



CONCRETE BLOCKOUT



WABO WB  
COMPRESSION SEAL



WABO WC  
COMPRESSION SEAL

NO.	DESCRIPTION	NAME	DATE
4			
3			
2			
1			

## REVISIONS

ALL CHANGES AND THE DESIGN, DETAILS AND MATERIALS FOR THE PROJECT ARE THE PROPERTY OF WATSON EDWARDS ACME AND ARE NOT TO BE REPRODUCED OR USED EXCEPT FOR THE PROJECT FOR WHICH THEY HAVE BEEN FURNISHED. ALL RIGHTS OF DESIGN AND INVENTION ARE HEREBY RESERVED.



95 Pineview Drive, Amherst, N.Y. 14120 TEL. (716) 691-7566 FAX (716) 691-8232

PROJECT:

WABO COMPRESSION SEAL

TITLE:

SALES DRAWING

DETAILED BY:

D. NULF

DATE:

2-23-88

CHECKED BY:

J. SOBOL

DATE:

2-23-88

SCALE:

3/4"=1"

WIA JOB NO.:

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SHEET NO.:

1 of 1

DRAWING NO.:

C-10826





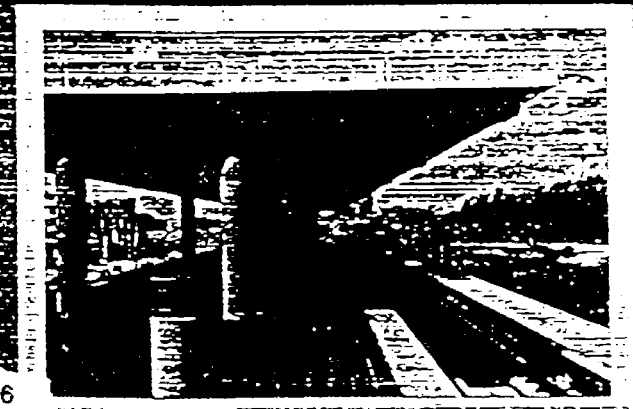
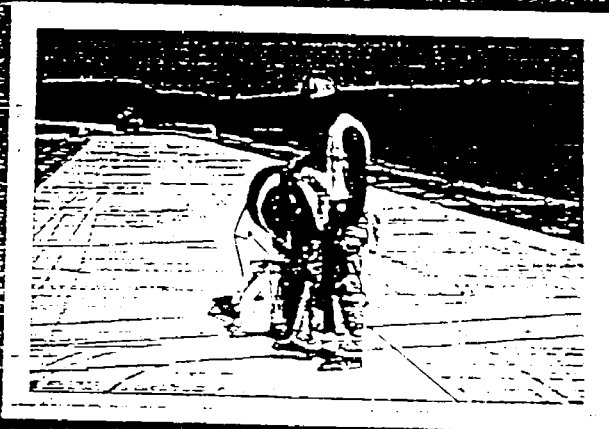
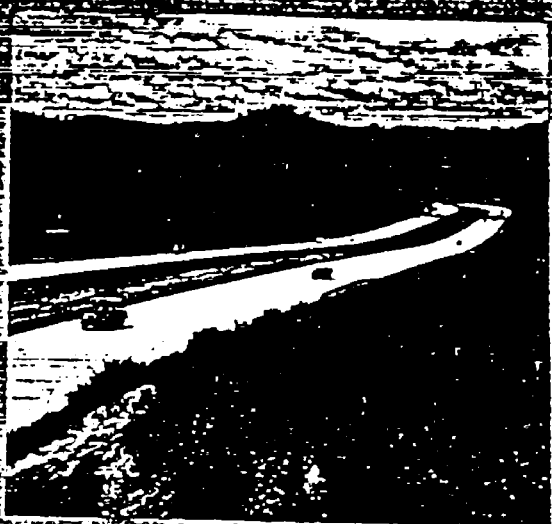
# THE D.S. BROWN COMPANY

CONTRACTORS • ENGINEERS • ARCHITECTS

1990

CONTRACTOR/EXPANSION  
CONSTRUCTION JOINTS

1990



# E AND V SERIES PAVEMENT SEALS

The DELASTIC Series "E" and "V" seals are the primary sealing systems for concrete pavement slabs in all major applications—primarily in concrete roadways and airport aprons and runways. Literally hundreds of miles of pavement seal have been laid in the past years and have outlasted all other types of sealing systems.

this machine lies not only in the speed of installation with zero percentage stretch of material, but also in sizable lubricant/adhesive savings. The design and execution of the sawed or formed concrete joints is the responsibility of the engineer and contractor.

## Specifications

### Advantages

Long, continuous sections can be installed in transverse and longitudinal concrete joints using The D.S. Brown Company's proven Delastal® "Auto-Installer" shown on the back cover. One operator can thus place thousands of feet of seal in a single day. The cost effectiveness of

The neoprene compound produces a product which materially conforms to ASTM D 2628-81. Lubricant/adhesives, when required, shall conform to ASTM D-2835/ASTM D-4070 respectively.

The Seal is to be recessed from the roadway surface by 0.125 in. or as specified by the appropriate State agency.



E-437



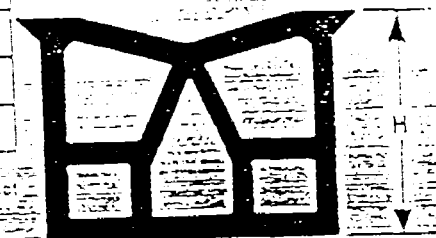
V-562



V-812



E-1253



E-2000

DELASTIC SEAL CATALOG NUMBER	SEAL CHARACTERISTICS			JOINT DESIGN CRITERIA			
	WIDTH (Dimension W)	HEIGHT (Dimension H)	MOVEMENT <sup>1</sup>	NARROWEST OPENING <sup>1</sup>	WIDEST OPENING <sup>1</sup>	MINIMUM DEPTH	
E-312	5/16 (7.94)	5/8 (15.88)	0.140 (3.55)	0.125 (3.18)	0.265 (6.73)	1-1/8 (28.58)	
E-437	7/16 (11.11)	15/16 (23.81)	0.184 (4.67)	0.167 (4.25)	0.371 (9.42)	1-1/4 (31.75)	
E-562	9/16 (14.29)	11/16 (17.45)	0.178 (4.52)	0.250 (6.35)	0.478 (12.14)	1-3/8 (34.93)	
V-562	9/16 (14.29)	11/16 (17.45)	0.178 (4.52)	0.250 (6.35)	0.478 (12.14)	1-3/8 (34.93)	
E-625	5/8 (15.88)	3/4 (19.05)	0.206 (5.23)	0.325 (8.26)	0.531 (13.49)	1-1/2 (38.10)	
E-667	11/16 (17.45)	13/16 (20.64)	0.259 (6.55)	0.325 (8.26)	0.584 (14.83)	1-1/2 (38.10)	
V-667	11/16 (17.45)	13/16 (20.64)	0.259 (6.55)	0.325 (8.26)	0.584 (14.83)	1-1/2 (38.10)	
E-812	13/16 (20.64)	15/16 (23.81)	0.346 (8.84)	0.350 (8.89)	0.698 (17.73)	1-5/8 (41.28)	
V-812	13/16 (20.64)	15/16 (23.81)	0.346 (8.84)	0.350 (8.89)	0.698 (17.73)	1-5/8 (41.28)	
E-1000	1 (25.40)	1 (25.40)	0.450 (11.43)	0.400 (10.16)	0.850 (21.59)	1-7/8 (47.63)	
V-1000	1 (25.40)	1 (25.40)	0.450 (11.43)	0.400 (10.16)	0.850 (21.59)	1-7/8 (47.63)	
E-1253	1-1/4 (31.75)	1 (25.40)	0.612 (15.54)	0.450 (11.43)	1.062 (26.97)	2-1/8 (50.98)	
E-1625	1-5/8 (41.28)	1-1/8 (28.58)	0.781 (19.84)	0.600 (15.24)	1.381 (35.08)	2-1/2 (63.50)	
V-1625	1-5/8 (41.28)	1-1/8 (28.58)	0.781 (19.84)	0.600 (15.24)	1.381 (35.08)	2-1/2 (63.50)	
E-2000	2 (50.80)	1-1/2 (38.10)	0.950 (24.13)	0.750 (19.05)	1.700 (42.18)	2 (50.80)	
E-2500	2-1/2 (63.50)	2-1/2 (63.50)	1.100 (27.94)	0.775 (19.65)	2.125 (53.98)	3-1/2 (88.90)	
E-3000	3 (76.20)	2-1/2 (63.50)	1.260 (32.00)	1.200 (30.48)	2.550 (64.77)	3-1/2 (88.90)	

<sup>1</sup>Thickness of seal wall and internal web are not drawn to scale. These dimensions vary with seal size; exact measurements will be supplied on request. (Please state model number.)

<sup>2</sup>Maximum movement that seal will accommodate in joint of correct design.

<sup>3</sup>A narrower opening will put excessive stress on seal and may cause premature failure.

<sup>4</sup>A wider opening may not provide sufficient compressive force to hold seal in place.

Meets ASTM D 2628 and AASHTO M 220 Standard Specifications B-7

DOW CORNING

**HIGHWAY/AIRPORT PRODUCTS**

**DOW CORNING®**

**SILICONE JOINT SEALANTS**

*Groundwork Takes Teamwork*



## HIGHWAY/AIRPORT PRODUCTS

# ***THE BENEFITS***

### ***Low- and ultra-low modulus.***

Each sealant stretches 100 percent in the joint with very little force. This places minimal strain on the bond line or joint walls, maximizing the probability of a successful seal with continuous or gradual joint movement.

Movement of highway joints caused by temperature, shrinkage, and vertical deflections under traffic requires a low-modulus sealant that does not strongly resist stress and/or shear — such as DOW CORNING® 888 silicone joint sealant or DOW CORNING® 888-SL self-leveling silicone joint sealant. The movement associated with asphalt shoulders caused by similar and other conditions requires an ultra-low-modulus sealant such as DOW CORNING® 890-SL self-leveling silicone joint sealant.

### ***Ease of installation.***

All three silicone joint sealants are ready to use as supplied. They require no mixing or heating and can be dispensed directly from the bulk container into the joints by hand or with an air-powered pump.

And DOW CORNING 888-SL self-leveling silicone joint sealant and 890-SL self-leveling silicone joint sealant are equally easy to install. Because they are self-leveling, no tooling is required. This unique feature allows for faster installation and reduced labor costs compared with non-self-leveling silicone sealants.

### ***Unprimed adhesion.***

All three sealants exhibit excellent unprimed adhesion to the recommended surfaces. The surfaces must be clean, dry, and frost free immediately prior to installation.



### ***All-temperature gunnability.***

The consistency of each sealant and the self-leveling characteristics of DOW CORNING 888-SL self-leveling silicone joint sealant and DOW CORNING 890-SL self-leveling silicone joint sealant are relatively unchanged over the normal installation temperature range.

### ***High movement capability.***

All three sealants perform in a continuous joint movement of  $\pm 100/-50$  percent. In new construction, all three sealants will take the 25-percent movement of each of two or three slab lengths working in unison before all the "shrink," or contraction, cracks occur.

### ***Weather resistance.***

These inorganic materials are 100 percent silicone rubber. Therefore, they are relatively unaffected by sunlight, rain, snow, ozone, or temperature extremes.

### ***Irregular surface sealing.***

All three products seal joints where spalls have occurred, provided adequate contact is made between the sealant and the substrate. The self-leveling ability of DOW CORNING 888-SL and 890-SL lends itself to sealing irregular joint surfaces by providing adequate contact to the substrate without the need for tooling.

### ***Elasticity.***

Each of the sealants can be stretched and held to 100 percent of the joint width. When released, each sealant will recover 95 percent or greater of the original dimension. This extension can be repeated many times, and the sealant will resume its original shape without splitting, cracking, or losing adhesion. Thus, when properly installed in a highway contraction joint, the sealant does not "pump" out of the joint during compression. Nor does it split, crack, or lose adhesion during extension.

### ***Resilience.***

Once cured, these sealants prevent stones and other incompressibles from entering the joint by "squeezing" them out as soon as the force pushing these incompressibles into the sealant is removed.

### ***Fast cure.***

Typically, these sealants skin over in one hour or less. With this fast cure and a recessed joint design, the road usually can be opened soon after sealing.

### ***Long-life reliability.***

Under normal conditions, cured sealant stays rubbery from  $-50^{\circ}\text{F}$  to  $300^{\circ}\text{F}$  ( $-45^{\circ}\text{C}$  to  $149^{\circ}\text{C}$ ) without tearing, cracking, or becoming brittle.

## *The ADDED BENEFITS*

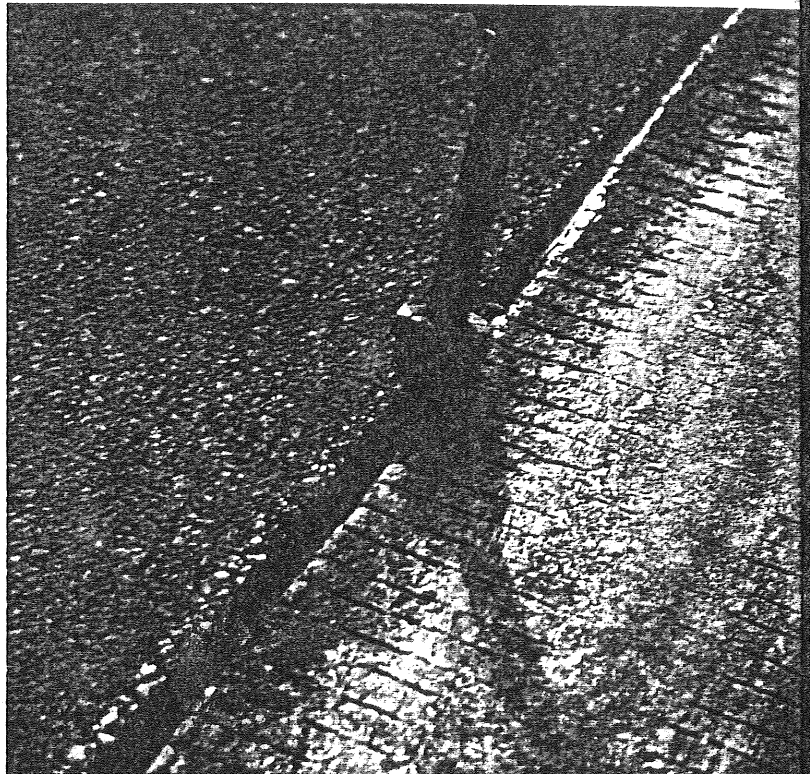
### *Compliance.*

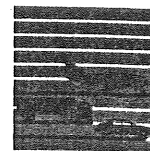
DOW CORNING 888 silicone joint sealant meets or exceeds both Federal Specifications TT-S-001543A Class A (one-part silicone sealants) and TT-S-00230C Class A (one-component sealants), which were written for construction sealants requiring extremely high movement capability. It also meets Canadian Specification 19GP9 Type I and approximately 35 Department of Transportation (DOT) specifications that require a low-modulus sealant with high movement capability.

And, the AASHTO-AGC-ARTBA Joint Committee (Task Group 23, Subcommittee on New Highway Materials) included a discussion of silicone joint sealants in its booklet entitled "Guide Procedures for Concrete Pavement 4R Operations - 1985." In addition, the Federal Aviation Administration recently published the "FAA Engineering Brief Number 36 - Silicone Joint Sealants." This publication approves the use of these materials in airfield situations. Also, the Army Corps of Engineers will be issuing a guide, #CRD-C-527 (draft), which will allow the use of silicone materials in military applications.

### *The Dow Corning reputation.*

DOW CORNING® silicone joint sealants offer unequalled performance in highway, airport, and parking deck applications. For 40 years, Dow Corning Corporation has shown engineers and contractors how high-performance silicone joint sealants can increase the safety and usefulness and extend the life of highway and airport construction.



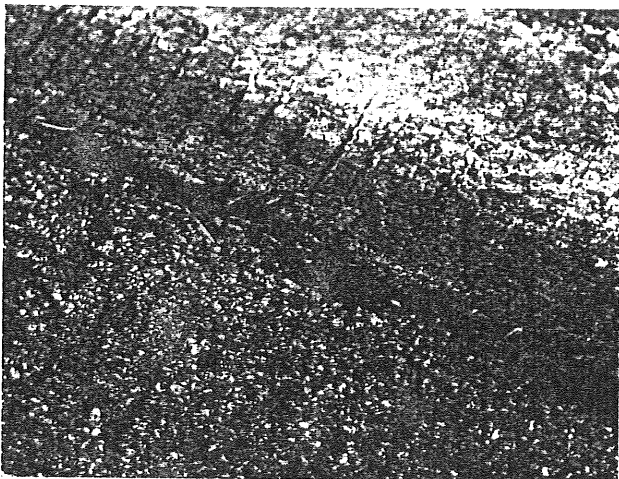
**DOW CORNING****SILICONE JOINT SEALANTS*****The problem.***

Water and deicing chemicals are major enemies when it comes to long-term pavement performance — because water and deicing chemicals can cause joint failures.

Contraction and expansion joint failures in highways, airport aprons, and parking decks lead to erosion of the pavement sub-base and/or corrosion of the metal reinforcement bars due to water and deicing chemicals entering the joints at the pavement surface.

These joints also sustain damage when incompressibles (dirt and/or stones) become lodged into the joint. Such damage results in spalling and/or breakage of concrete along the joint edge.

That's why highway, airport, and parking deck joints require a tough but flexible sealant that can withstand extreme weather conditions, as well as excessive horizontal and vertical movement.

***The solution.***

Fight back with DOW CORNING® silicone joint sealants.

DOW CORNING silicone joint sealants help prevent erosion, corrosion, spalling, and concrete breakage in contraction and expansion joints.

And, Dow Corning offers not one, but *three* silicone joint sealants to get the job done.

**DOW CORNING® 888** silicone joint sealant is a one-part silicone, non-sag formulation that can be installed over a wide temperature range. And because of its non-sag characteristics, it can be used on both horizontal and vertical surfaces. It cures on exposure to atmospheric moisture to form a permanently flexible, low-modulus, high-elongation silicone rubber joint seal. DOW CORNING 888 silicone joint sealant is ideal for use in new or old Portland cement concrete-to-concrete joints that undergo a high degree of movement, such as transverse pavement expansion and contraction joints in highways, airport aprons, runways, and parking decks.

**DOW CORNING® 888-SL** self-leveling silicone joint sealant has the same characteristics as DOW CORNING 888 silicone joint sealant and is also used in Portland cement concrete-to-concrete applications. DOW CORNING 888-SL self-leveling silicone joint sealant is unique, however, because it is self-leveling. Due to this unique feature, no tooling is required, allowing for easier and faster application.

**DOW CORNING® 890-SL** self-leveling silicone joint sealant for asphalt is also a one-part silicone sealant. While DOW CORNING 888 silicone joint sealant and 888-SL self-leveling silicone joint sealant are low-modulus sealants, DOW CORNING-890-SL self-leveling silicone joint sealant cures to produce an ultra-low-modulus sealant. Because of this ultra-low-modulus, DOW CORNING 890-SL is ideally suited to applications such as concrete/asphalt shoulder joints, where movement occurs differently because two dissimilar materials are used.

# New Product Information

DOW CORNING

## DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT

### DESCRIPTION

DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT is a one-component self-leveling sealant that readily extrudes over a wide temperature range and cures to produce a durable, flexible, low-modulus silicone rubber joint seal for use in Portland Cement Concrete (PCC) applications.

Because of its low-modulus characteristics and good extension/compression recovery (+100%/-50% of original joint width), DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT gives outstanding performance in highway, airport, bridge and parking deck joints in which extreme movement occurs.

Highway concrete contraction/expansion joints are generally sealed to prevent erosion of pavement sub-base and/or corrosion of metal tie bars embedded in the concrete. Such corrosion results from water and deicing chemicals entering the joints at the pavement surface.

Sealing of highway joints also prevents spalling and breakage of concrete along the slab edge which occurs when non-compressibles (dirt, stones and/or ice) are forced into or formed in the joint.

DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT features:

- Ease of application—self-leveling (no tooling step), one-component, ready to use as supplied; dispensed directly from bulk container into joint by hand or with an air-powered pump
- All-temperature gunnability—consistency and self-leveling characteristics are relatively unchanged over normal installation temperature range

### DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT

Type .....	Low-modulus silicone
Cure .....	One part; cures at room temperature by reaction with moisture in air
Special properties .....	Self-leveling, no tooling required; bonds to concrete without use of primer; good recovery from extension/compression
Primary Use .....	Sealing concrete pavement contraction joints, especially those exposed to extreme movement

- Unprimed adhesion—primer is not required for bonding to concrete. For optimum adhesion, the surface must be clean, dry and frost-free.
- Seals irregular surfaces—self-leveling characteristics of the sealant lend itself to sealing irregular joint surfaces by providing adequate

contact to the substrate without the need for tooling.

- High movement capability—the sealant will perform in a continuous joint movement of +100% and -50%. In new construction, it will take a 25% movement of each of 2 or 3 slab lengths working in unison before all the "shrink" or contraction cracks occur.

### TYPICAL PROPERTIES

These values are not intended for use in preparing specifications or joint designs, but for comparison of rubber properties.

#### As Supplied

Color .....	Dark Gray
Flow, Sag or Slump .....	Self-leveling
Extrusion Rate, grams per minute .....	460
Percent Solids, % .....	94
Specific Gravity .....	1.3-1.4
Working Time, minutes .....	15
Skin-Over Time, at 25° C (77° F), minutes .....	25
Cure Time, at 25° C (77° F), days .....	14
Full Adhesion, days .....	14-21

#### As Cured—after 21 days at 25° C (77° F) and 50% RH

Elongation, percent minimum .....	1400
Modulus @ 50% Elongation, psi .....	16
Modulus @ 100% Elongation, psi .....	18
Modulus @ 150% Elongation, psi .....	20
Durometer Hardness, Shore 00, points .....	65
Adhesion to Concrete, minimum percent elongation .....	500

Specification Writers: Please contact Dow Corning Corporation, Midland, Michigan, before writing specifications on this product.



- **Low modulus**—the sealant stretches 100% in the joint with very little force. This places very little stress on the bond line or joint wall. This maximizes the probability of a successful seal with a continuous or gradual joint movement. Joint movement caused by temperature, traffic etc. requires a sealant that does not strongly resist stress and/or shear.

- **Fully elastic**—the sealant can be stretched to 100% or compressed to 50% of the joint bond width and held there. When released, it will recover 95% or greater of the original dimension. The extension and/or compression can be repeated many times and the sealant will resume its original shape without splits or cracks. Thus, when properly installed in a highway contraction joint, it does not "pump" out of the joint during compression. Nor does it split, crack or lose adhesion during extension.

- **Resilient**—once cured, the sealant prevents stones and other non-compressibles from entering the joint by "squeezing" them out as soon as the force pushing these non-compressibles into the sealant is removed.

- **Good weatherability**—a 100% silicone rubber is relatively unaffected by sunlight, rain, snow, ozone, or temperature extremes. Most organic sealants stiffen in cold temperatures and soften in warm weather. Organics also degrade and crack in sunlight.

- **Cure time**—typically, the sealant will have a skin-over time of one hour or less. With a recessed joint design, the road can be opened to traffic soon after sealing in most applications.

- **Long-life reliability**—under normal conditions, cured sealant stays rubbery from -45 to 149° C (-50 to 300° F) without tearing, cracking or becoming brittle.

## USES

DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT is especially effective for sealing transverse contraction and expansion joints, longitudinal, center line and concrete to concrete shoulder joints in Portland Cement Concrete pavement. These concrete expansion contraction joints can be on a roadway or a bridge.

DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT can be used as the original sealant in new concrete construction or as a remedial or repair sealant in old construction. In new construction, it provides the extra insurance needed if all the "shrink" or contraction cracks do not occur during the initial "weakening" step. An example would be, when two or three concrete lengths act in unison, stressing a sealant two or three times the design dimensions or movement.

For use in repair or remedial applications where other joint sealing materials have failed because of excessive movement or poor weatherability, DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT can be used to seal irregularly shaped and/or spalled joints. These joints should be dry and free of all old sealing compounds.

## LIMITATIONS

DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT is not recommended for continuous water immersion. It should not be applied in totally confined spaces where the sealant is not exposed to atmospheric moisture. The sealant should never be applied to wet or damp concrete or installed during inclement weather. New concrete should be allowed to cure and dry for at least 7 days of good drying weather. For each day of rain that occurs during that period, an additional day should be added to the 7-day drying time.

The sealant bead must be recessed below the pavement surface to prevent abrasion from traffic and snow removal equipment.

The adhesion to joints that are formed with products other than Portland Cement concrete should be checked before performing full-scale sealing.

DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT is a self-leveling sealant which requires no tooling. Because of this special feature, the sealant should be applied only in horizontal joints.

## HOW TO USE

Low-modulus DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT

SEALANT easily withstands extreme joint movement when properly applied. The sealant will withstand 100% extension and 50% compression of the original joint width. However, the recommended joint movement design is for  $\pm 25\%$  (50% total) and not at the sealant limits. This difference ensures a successful seal when job site joint widths are different than designed widths. Therefore, the joint design dimensions should be less than the ultimate sealant capability.

A thin bead of silicone sealant will accommodate more movement than a thick bead. DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT should be no thicker than 1/2 inch (12.7 mm) and no thinner than 1/4 inch (6.4 mm). Within these limits, the sealant width-to-depth ratio should be 2:1.

In all cases, the sealant must be recessed below the pavement surface at least 1/4 inch with 1/2 inch recess being acceptable in wider joints (see Table I). Consideration should also be given to other possible road-working operations, such as diamond-grinding of the surface. Activities of this type would require the sealant bead to be recessed even deeper.

DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT is a self-leveling sealant which does not require an extra tooling step. Sealant depth should be controlled to provide a recessed sealant surface.

In new construction where the joint is a new cut, a shallow cut is recommended where the backer rod is placed on the "shelf" or bottom of the joint (see Figure I). Recommended depths are shown in Table I. This design makes it easier to install backer rod at a constant depth, thus the sealant bead will also be easier to control. A shallow cut design also saves saw blades and time and is recommended when the pavement will see foot traffic, as in urban areas.

In repair or remedial work where previous sealing materials have been of a joint filling type rather than a joint sealing type, or where the joint is not broadened by sawing, a standard joint design is recommended in which the backer rod is slightly above the shelf. Extra space (1/4 inch to 1/2 inch) between the bottom of the backer rod

**TABLE I: RECOMMENDED BACKER-ROD INSTALLATION (SHALLOW CUT)\***

Joint Width	1/4"	3/8"	1/2"	3/4"	1"
Recessed Below Surface	1/4"	1/4"	1/4"	1/4"	1/2"
Sealant Thickness	1/4"	1/4"	1/4"	3/8"	1/2"
Backer Rod Diameter	3/8"	1/2"	5/8"	7/8"	1 1/4"
Total Joint Depth	7/8-1"	1-1 1/8"	1 1/8-1 1/4"	1 1/2-1 5/8"	2 1/4-2 3/8"

\*On road surfaces where grinding is planned at a later date, the sealant and backer rod should be installed so that sealant is approximately 1/4 inch below the road surface after grinding is complete. An additional small amount should be added to allow for surface imperfections on the bottom and to provide room for old sealant to pump up from below during rehabilitation work in the summer months.

and the shelf should be provided to allow for possible "pumping" of old joint filling material from the bottom of the joint.

**DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT** is part of a system which must include the proper backer rod and proper installation procedures. **SOF ROD**, supplied by Applied Extrusion Technologies, is recommended for general use especially in irregular joints. In joints that are very consistent in width and have smooth parallel surfaces, expanded closed-cell polyethylene foam may be used. Several other types of back-up materials (paper, fibrous ropes and open-cell polyurethane foam) are available but have proven to be

unacceptable. It is recommended that care be given to selection of the proper oversized backer, so that it fits tightly in the joint. This will prevent the self-leveling sealant from leaking past the backer rod to the bottom of the joint.

#### INSTALLATION

When installing **DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT**, it is critical that the joint be clean and dry prior to and during installation. Several procedures have been used in the past. However, experience has shown that some are less reliable than others. Water blasting, grinding, routing and wire brushing are no longer acceptable cleaning methods.

Instead, the following procedure is considered most reliable and is

recommended for cleaning and drying the joint.

1. Clean all joints of contaminants and impurities to the depth at which the sealant and backer rod are to be installed. This may require cutting immediately followed by flushing with water to remove residual laitance. Flushing should be done in only one direction to reduce recontamination of the joint faces. After drying, at least the top inch of each joint face must be sandblasted to ensure a sound, clean surface for sealant application.

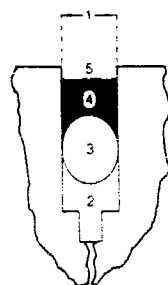
Sandblasting should be performed in two passes (one for each joint face) with the nozzle held at an angle to the face and no more than 2 inches from it.

2. Blow out the dust, loose particles and other debris from the joints in one direction only with oil-free compressed air. Surfaces must be clean, dry, frost-free and dust-free and can be checked by running a finger along the joint face. If a white, chalky dust appears on the finger, the joint must be recleaned.

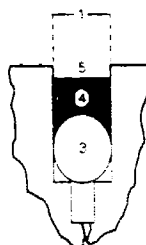
3. Install the recommended back-up material in the joints. This material permits application of the sealant at a controlled depth and acts as a bond breaker between the sealant and the bottom of the joint to allow the silicone sealant to stretch freely with joint movement. See Table I for the proper depth.

4. Apply **DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT** in a continuous operation to properly fill and seal the joint width (see Table II). The nozzle used to install the sealant should be such that the joint is filled from the bottom up. Filling in this manner displaces air from the joint and eliminates the likelihood of creating air voids in the sealant. Do not overfill the joint. The sealant must be recessed below the pavement

**FIGURE I: GOOD JOINT DESIGNS**



**STANDARD JOINT**



**SHALLOW CUT JOINT  
FOR NEW CONSTRUCTION**

1. Joint width wide enough to accommodate movement. (For additional information on joint width, see papers by Spells and Klosowski, "Silicone Sealants for Use in Concrete Construction," Vol. 1, No. 1, *American Concrete Institute*, SP-70, 1981 and J.B. Cook, "Construction Sealants and Adhesives," Wiley-Interscience, 1970.
2. Joint sawed deep enough to allow backer-rod/sealant placement and space for pumping of old sealing compounds. *NOTE:* This applies to standard joints only; void space beneath backer rod in new construction is not needed.
3. Proper backer-rod placement
4. Sealant installed to proper depth and width.
5. Sealant recessed 1/4 inch to 1/2 inch below pavement surface.

**TABLE II: ESTIMATING REQUIREMENTS\***

**Linear feet per gallon of DOW CORNING 880-SL SELF-LEVELING SILICONE JOINT SEALANT FOR ASPHALT for various joint widths.**

Joint Width, Inches	Sealant Bead Thickness, Inches	Minimum Joint Depth, Inches	Packer Rod Diameter, Inches	Backer Rod Placement Depth, Inches	Estimated Linear Feet/Gallon
1/4	1/4	1	3/8	1/2	275
3/8	1/4	1-1/4	1/2	1/2	185
1/2	1/4	1-1/4	5/8	1/2	140
5/8	5/16	1-1/2	3/4	9/16	90
3/4	3/8	1-3/4	1	7/8	60
7/8	7/16	1-7/8	1	11/16	45
1	1/2	2	1-1/4	3/4	35
>1	1/2	2+	1-1/4+	3/4	—

\*Volumes will vary depending on joint design, tooling, backer-rod placement and waste.

surface (see Figure 1). In the case of an overfilled joint, excess sealant must be removed such that proper joint geometry and recess are maintained. For maximum performance, the sealant should be applied at temperatures above 40° F (4.4° C).

New concrete must be allowed to cure and dry for a minimum of 7 good drying days prior to sealant installation for optimum adhesion. For each day of wet or rainy weather, an additional day of dry weather must be added to the drying period.

5. DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT is self-leveling and tooling the sealant is not recommended. The sealant will self-level and develop good contact with the joint surface without tooling.

6. Excess sealant may be cleaned off tools and equipment while in an uncured state with a commercial solvent such as xylol or a "high-flash" solvent. Use appropriate precautions with regard to fire hazards and eye and skin contact. (Use goggles and gloves, if needed.)

7. Joints that have been properly recessed may be opened to traffic as soon as the installation equipment can be cleared from the traffic lane.

**NOTE:** For complete installation instructions, see Installation Guide for DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT.

#### CAUTION

Before handling sealant, read product and material safety data sheets for detailed use and health information.

Direct contact with uncured sealant may irritate eyes slightly. Avoid eye contact. Do not handle contact lenses with sealant on hands. In case of eye contact, flush eyes with water for 15 minutes.

Uncured sealant may cause injury if swallowed in large amounts. Do not put in mouth. If swallowed, obtain immediate medical attention.

Toxicology studies indicate that repeated, prolonged overexposure to DMF or N-MA causes adverse reproductive effects in laboratory animals. Avoid breathing vapors. Do not use in poorly ventilated spaces. Avoid prolonged skin contact.

Sealant contains dimethylformamide (DMF). Overexposure can injure lungs, liver, kidneys and heart.

**KEEP OUT OF REACH OF CHILDREN.**

#### SHIPPING LIMITATIONS

None.

#### STORAGE AND SHELF LIFE

When stored in original, unopened containers at or below 32° C (90° F), DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT has a shelf life of 6 months from date of shipment. Keep containers tightly closed.

#### PACKAGING

DOW CORNING 888-SL SELF-LEVELING SILICONE JOINT SEALANT is supplied in 29-fl oz (857 mL) disposable plastic cartridges, 4.5-gal (17-L) plastic bulk pails, and 40-gal bulk drums.

#### WARRANTY INFORMATION—PLEASE READ CAREFULLY

Dow Corning believes that the information in this publication is an accurate description of the typical characteristics and/or uses of the product or products, but it is your responsibility to thoroughly test the product in your specific application to determine its performance, efficacy and safety.

Unless Dow Corning provides you with a specific written warranty of fitness for a particular use, Dow Corning's sole warranty is that the product or products will meet Dow Corning's then current sales specifications. **DOW CORNING SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR USE.**

Your exclusive remedy and Dow Corning's sole liability for breach of warranty is limited to refund of the purchase price or replacement of any product shown to be other than as warranted, and Dow Corning expressly disclaims any liability for incidental or consequential damages.

The information and data contained herein are based on information we believe reliable. You should thoroughly test any application, and independently conclude satisfactory performance before commercialization. Suggestions of uses should not be taken as inducements to infringe any particular patent.

**DOW CORNING CORPORATION  
MIDLAND, MICHIGAN 48640**

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## Product Information

DEC 21 1990

Mobay Corporation  
Inorganic Chemicals Division

ARIZONA TRANSPORTATION  
RESEARCH CENTER

# Baysilone

960 Self-Leveling Silicone Concrete Joint Sealant

### Description

Baysilone 960 SL Silicone Sealant is a one-component material which cures with the moisture in the air to form a flexible, low-modulus rubber seal particularly suitable as a concrete joint sealant. The low-modulus properties enable the sealant to withstand movement of  $\pm 50\%$  or  $+100\%$  of the original joint width (refer to Table I).

Baysilone 960 SL Silicone Sealant is 100 percent silicone rubber which is highly weather resistant. This provides for longer performance life than petroleum (organic) based joint sealants. The sealant is basically unaffected by sunlight, rain, ozone, and high or low temperatures. The rubber is also resistant to certain chemicals. Deicing chemicals, automotive fuels, and jet fuel do not affect the performance of the sealant when adequate drainage or clean-up occurs.

#### Product Features

- One Component Product
- Ease of Dispensing
- Self-Leveling
- Primerless Adhesion to Concrete
- UV and Ozone resistant
- Wide temperature range performance
- Low modulus

#### Advantages

- No mixing required
- Can be pumped from the container with 20 psi air pressure.
- No tooling required
- No primer needed to bond to concrete.
- Good weatherability and long service life. Will not dry out, become brittle, or crack.
- Sealant stays flexible at temperatures from  $-40^{\circ}\text{F}$  to  $300^{\circ}\text{F}$ .
- Performs in joints where movement occurs.

### Applications

Baysilone 960 SL Silicone Sealant may be installed in existing or new portland concrete cement (PCC) highway contraction (transverse) joints, in the center-line longitudinal joint, and/or in shoulder longitudinal joints where concrete shoulders are prevalent. Baysilone 960 SL Silicone Sealant is also used to seal concrete joints on airport runways, taxiways, and aprons.

### Specifications

Baysilone 960 SL Silicone Sealant meets or exceeds the requirements of federal specifications TTS-00230C (COM-NBS), and TTS-001543A (COM-NBS).

### Joint Design

Proper joint design plays a major role in the performance of Baysilone 960 SL Silicone Sealant as a joint sealant. The dimensions of the joint should be sufficiently large enough to avoid movement beyond the sealant's capability.

The joint should be in the range of  $\frac{1}{4}$  to 1 inch. Thermal expansion of the pavement, joint spacing, and changes in temperature all must be considered when determining proper joint width. When joint spacing exceeds 20 feet and climate conditions are severe, it is advisable to have the joint width greater than  $\frac{1}{2}$  inch.

The joint depth varies according to the designed width. It must be deep enough to accommodate the sealant, backer rod, and a space for old sealers and debris that may pump up into the joint when the concrete expands. The sealant bead should have a depth of one-half the width. The sealant surface should be  $\frac{1}{4}$  to  $\frac{1}{2}$  inch below the pavement surface to prevent traffic contact and ensure optimal performance. The diameter of the backer rod must be approximately 25% larger than the width of the joint. The space below the backer rod need not be greater than  $\frac{1}{4}$  to  $\frac{1}{2}$  inch. For example, the total depth for a joint which is 1 inch wide would be in the range of 2 to 2 $\frac{3}{4}$  inches. Table II gives infor-

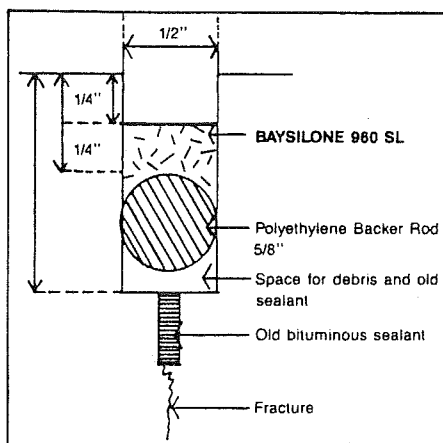
Table I: Typical Properties

Uncured Properties*		Test Method
Color:	Gray, Off-White	
Flow or Sag:	Self-Leveling	
Working Time:	15 minutes	
Tack-Free Time:	1-2 hours	ASTM C679
@ 77°F (25°C), 50% R.H.		
Viscosity:	20,000-50,000 cst	Brookfield
Specific Gravity:	1.07	
Cured Properties* (@ 77°F (25°C), 50% RH, 21 days)		Test Method
Shore A Hardness:	5	ASTM D2240
Joint Movement Capability:	±50%	ASTM C719
	+100%	<sup>1</sup> MCTM 001
Ultimate Tensile:	75 psi	ASTM D412
Tensile Stress at 150%		
Elongation:	30 psi	ASTM D412
Percent Elongation:	600%	ASTM D412

\*These typical property values are provided as general information only. They should not be used for writing specifications. Contact Mobay for specification values.

<sup>1</sup>MCTM 001 is a Mobay Corporate Test Method which corresponds to ASTM test methods and is available upon request.

mation on joint widths and corresponding depths. A typical joint would have the following design:



### Joint Preparation and Sealant Installation:

The sealant can be applied over a wide temperature range by way of an air-powered dispensing pump set at 20 psi. Prior to sealing, the ambient temperature should be above 50°F with the concrete dry (no residual moisture from morning frost and dew) so that the joint is at its optimum opening width. When applying sealant at temperatures below 50°F, extra care must be taken to assure that the joint remains dry and frost free before

sealant installation. Also, it should be noted that at temperatures below 77°F the tack free time and cure through of the sealant will take longer.

The joints must be properly prepared for sealant installation. Both new or previously sealed joints must be clean and dry and free of any foreign materials such as; oil, grease, old sealant, and dried saw slurry. For previously sealed joints that are being resealed, mechanically remove all of the existing sealant prior to saw cutting the joint, care should be taken not to melt residual asphaltic sealant and spread it on the joint face with the hot saw blade. After saw cutting, both faces of the joint should then be sandblasted and/or high-pressure water washed, followed by high pressure air blowing just prior to sealant application, to remove any wind-blown debris. Make sure concrete is dry and free of residual moisture after water blasting.

For joints in new construction, the fresh-cut joints should be cleaned thoroughly on both sides following the procedure outlined above. Please note, however, that fresh concrete must be allowed to cure 5-7 days, dependent

upon weather conditions, before sealant is installed. The time frame allows for the removal of all residual moisture in the concrete.

An approved closed cell polyethylene backer rod must be installed into the joint before sealant application. This product prevents 3-sided adhesion of the sealant which would cause joint failures. The backer rod must be 25% larger in diameter than the width of the joint in order to prevent the sealant from flowing around the rod and to help the sealant maintain good side wall contact should any joint movement occur during the curing phase. If the joints are of uneven widths or excess movement is expected in the joint then a soft compressable polyethylene rod of larger diameter is recommended. Care should be taken not to puncture the backer rod during installation.

Baysilone 960 SL Silicone Sealant is available in pails and drums, but for highway applications the 55 gallon drum (with 45 gallons of material) is most common. Remove the lid and untie the plastic liner, pulling it out and down over the outside of the drum. Place the drum under appli-

**Table II: Joint Widths/Depths**

Joint Width	Sealant Recess	Sealant Depth	Backer Rod Diameter	Total Joint Depth
1/4"	1/4"	1/4"	5/16"	13/16 - 1 5/16"
3/8"	1/4"	1/4"	1/2"	1 - 1 1/2"
1/2"	1/4"	1/4"	5/8"	1 1/8 - 1 5/8"
5/8"	1/4"	5/16"	3/4"	1 5/16 - 1 13/16
3/4"	1/4 - 1/2"	3/8"	7/8"	1 1/2 - 2 1/4"
7/8"	1/4 - 1/2"	7/16"	1"	1 11/16 - 2 7/16"
1"	1/4 - 1/2"	1/2"	1 1/4"	2 - 2 3/4"

cator pump and lower the clean follower-plate onto the sealant using the pump manufacturer's recommended procedures.

Baysilone 960 SL Silicone Sealant typically flows through the lines of an air-powered dispensing pump at approximately 20 psi. For best results, sealant should be installed in the joint by pushing it ahead of the tip of the wand - not by pulling it - into the joint. No tooling is required for the self-leveling sealant.

Table III provides estimated linear feet of coverage per gallon of Baysilone 960 SL Silicone Sealant for various sized joints.

The highway lanes that have been sealed should not be opened for traffic until the sealant is tack free to the touch. Tack free time is dependent upon the installed ambient

temperature and humidity levels. At 77°F and 50% relative humidity the sealant will become tack free within 2 hours while cool, dry days may require longer to be tack free, and warmer more humid days may shorten the tack free time. These same temperatures and humidity levels affect the thru cure rate of the sealant.

#### **Cure Rate/Adhesion**

Baysilone 960 SL Silicone Sealant cures through from the outside to the inside and is dependent on the temperature and contact with moisture in the air. At a constant temperature and humidity of 77°F and 50% relative humidity, the sealant will cure through 1/8 inch from any air interface in 7 days. If the constant or intermittent temperatures and/or humidity are lower then the cure through rate will be slower. It is typical for the sealant at the bottom

and center of the joint to cure more slowly because the exposure to air has been limited by the backer rod.

The adhesion of the sealant to the sidewalls is also effected by the cure rate. The adhesion increases with time until the sealant has completely cured. At constant 77°F and 50% relative humidity, the typical adhesion properties will be achieved in 21 days. If the weather conditions result in a slower cure rate, then it will take longer to get the typical adhesion properties. Also, any large or rapid movements of joint or immersion in water from a hard rain during the curing phase could adversely affect the sealant adhesion.

These factors concerning cure rate and adhesion should be considered when planning installation, work closures, or evaluating projects during installation.

**Table III:**

**Estimated linear feet of coverage per gallon of  
Baysilone 960 SL Silicone Sealant**

Width of Joint (inches)	Depth of Sealant (inches)	Linear feet/gallon
1	1/2	28
7/8	7/16	38
3/4	3/8	51
5/8	5/16	76
1/2	1/4	114
3/8	1/4	151
1/4	1/4	229

#### **Equipment Recommendations**

Complete units include an air powered pump, follower plate, hose, gun, and applicator nozzle. The extrusion pumps are available with various output capacities. The hoses and connections must not allow moisture penetration. Teflon<sup>®</sup> lined hoses are recommended because of its low moisture permeability. It should be noted that the rate of sealant delivery is affected by air pressure, hose length, hose diameter, and nozzle diameter. There are several manufacturers of the installation equipment who

**Footnote:** Teflon<sup>®</sup> is a registered trademark of E.I. DuPont de Nemours & Co., Inc.

should be consulted regarding their recommended procedures for equipment use (refer to Table IV).

### **Health and Safety Information**

During cure a mild vapor is released, therefore, adequate ventilation should be assured. Avoid contact with the eyes. In case of contact with the eyes,

immediately flush eyes with water for at least 15 minutes and consult a physician. Wearers of contact lenses should be certain that all silicone is removed from the hands before touching the lenses. Contact lenses can absorb the silicone and cause damage or discomfort to the eyes. The product may irritate the skin, therefore, wipe off all silicone with a

dry cloth or paper towel and wash with soap and water. Keep away from children.

Appropriate literature has been assembled which provides information concerning the health and safety concerns that must be observed when handling Mobay products mentioned in this publication. Before working with any product mentioned in this publication, you must read and become familiar with the available information concerning its hazards, proper use and handling. This cannot be overemphasized. Information is available in several forms, e.g., material safety data sheets and product labels. Consult your Mobay representative or contact the Corporate Occupational and Product Safety Group.

**Table IV: Manufacturers of Installation Equipment**

Aro Corporation Bryan, OH 43506 419-636-4242	Lincoln Industrial Division St. Louis, MO 63120 314-679-4200
Graco, Inc. Minneapolis, MN 55440 612-623-6000	Pyles Industries, Inc. Wixom, MI 48096 313-349-5500

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# Information About Silicone Sealants

Trade Name

Dow Corning Corporation

Midland, Michigan 48666  
(517) 496-6000

Product Information Dept.

## DESCRIPTION

DOW CORNING® 888 silicone joint sealant is a one-part, cold-applied silicone material that readily extrudes over a wide temperature range and cures to produce a durable, flexible, low-modulus silicone rubber joint seal for use in Portland Cement Concrete (PCC) applications.

Because of its low-modulus characteristics and good extension/compression recovery (+100/-50 percent of original joint width), DOW CORNING 888 silicone joint sealant gives outstanding performance in highway, airport, bridge and parking deck joints in which extreme movement occurs.

Highway concrete contraction/expansion joints are generally sealed to prevent erosion of pavement sub-base and/or corrosion of metal tie bars embedded in the concrete. Such corrosion results from water and deicing chemicals entering the joints at the pavement surface.

Sealing of highway joints also prevents spalling and breakage of concrete along the slab edge, which occurs when noncompressibles (dirt, stones and/or ice) are forced into or form in the joint.

DOW CORNING 888 silicone joint sealant features:

- Easy to use – one-component, cold-applied, ready-to-use as supplied; no mixing required; dispensed directly from bulk container into joint by hand or with an air-powered pump.
- All-temperature gunnability – consistency is relatively unchanged over normal installation temperature range.

## DOW CORNING® 888 SILICONE JOINT SEALANT

Type .....	Low-modulus silicone
Cure .....	One part, cures at room temperature by reaction with moisture in air
Special Properties .....	Easy to use, bonds to concrete without use of primer; good recovery from extension/compression
Primary Use .....	Sealing highway concrete contraction joints, especially those exposed to extreme movement

- Unprimed adhesion – primer is not required for bonding to Portland Cement Concrete. For optimum adhesion, the surface must be clean, dry and frost-free.
- Seals irregular surfaces – can be used to seal joints where spalls have occurred, provided adequate

contact is made between sealant and substrate.

- High movement capability – the sealant will perform in a continuous joint movement of +100/-50 percent. In new construction, it will take the 25 percent movement of each of two or three slab lengths working in

## TYPICAL PROPERTIES

These values are not intended for use in preparing specifications or joint designs, but for comparison of rubber properties.

### As Supplied

Color .....	Gray
Flow, Sag or Slump .....	Nil
Extrusion Rate, grams per minute .....	90-250
Specific Gravity .....	1.450-1.515
Skin-Over Time, at 25 C (77 F), minutes .....	10
Tack-Free Time, at 25 C (77 F), hours .....	1
Cure Time, at 25 C (77 F), days .....	7-14
Full Adhesion, days .....	14-21

### As Cured – after 7 days at 25 C (77 F) and 50 percent RH

Elongation, percent minimum .....	1200
Modulus, at 150 percent Elongation, psi maximum .....	45
Durometer Hardness, Shore A points .....	15
Joint Movement Capability, +100/-50 percent, 10 cycles .....	No failure
Adhesion to Concrete, minimum percent Elongation .....	+500

Specification Writers: Please contact Dow Corning Corporation, Midland, Michigan, before writing specifications on this product.



unison before all the "shrink" or contraction cracks occur.

- Low modulus – the sealant stretches 100 percent in the joint with very little force. This places very little strain on the bond line or joint wall. This maximizes the probability of a successful seal with continuous joint movement. Joint movement caused by temperature, traffic and faulting requires a sealant that does not strongly resist stress and/or shear.
- Fully elastic – the sealant can be stretched to 100 percent or compressed to 50 percent of the joint bond width and held there. When released, it will recover 95 percent or greater of the original dimension. The extension and/or compression can be repeated many times and the sealant will resume its original shape without splits or cracks. Thus, when properly installed in a highway contraction joint, it does not "pump" out of the joint during compression. Nor does it split, crack or lose adhesion during extension.
- Resilient – once cured, the sealant prevents stones and other noncompressibles from entering the joint by "squeezing" them out as soon as the force pushing these noncompressibles into the sealant is removed.
- Good weatherability – its 100 percent silicone rubber is virtually unaffected by sunlight, rain, snow, ozone or temperature extremes.
- Fast cure – typically, the sealant will have a tack-free surface in one hour or less. With this fast cure and recessed joint design, the road can be opened soon after sealing in most applications.
- Long-life reliability – under normal conditions, cured sealant stays rubbery from -45 to 149 C (-49 to 300 F) without tearing, cracking or becoming brittle.
- Compliance with performance requirements – meets and exceeds both Federal Specifications TT-S-001543A Class A (one-part silicone sealants) and TT-S-00230C Class A (one-component sealants) that were written for construction sealants requiring extremely high movement capability. Also meets

Canadian Specification 19GP9 Type I and approximately 35 Department of Transportation (DOT) specifications that require a low-modulus sealant with high movement capability.

- The AASHTO-AGC-ARTBA Joint Committee (Task Group 23, Subcommittee on New Highway Materials) included a discussion of silicone joint sealants in its booklet titled "Guide Procedures for Concrete Pavement 4R Operations – 1985." In addition, the Federal Aviation Administration has published the "FAA Engineering Brief Number 36 – Silicone Joint Sealants." This publication approves the use of these materials in airfield situations.

## USES

DOW CORNING 888 silicone joint sealant is especially effective for sealing transverse contraction and expansion joints, longitudinal, center line and shoulder joints in Portland Cement Concrete. These concrete expansion/contraction joints can be on a roadway or a bridge.

DOW CORNING 888 silicone joint sealant can be used as the original sealant in new concrete construction or as a remedial or repair sealant in old construction. In new construction, it provides the extra insurance needed if all the "shrink" or contraction cracks do not occur during the initial "weakening" step. Thus, two or three concrete lengths act in unison, stressing a sealant two or three times the design dimensions or movement.

For use in repair or remedial applications where other joint sealing materials have failed because of excessive movement or poor weatherability, DOW CORNING 888 silicone joint sealant can be used to seal irregularly shaped and/or spalled joints. Thus, the joints do not need reforming before sealing. These joints should be dry and free of all old sealing compounds.

## LIMITATIONS

DOW CORNING 888 silicone joint sealant is not recommended for continuous water immersion. It should not be applied in totally confined spaces where the sealant is not exposed to atmospheric moisture.

The sealant should never be applied to wet or damp concrete or installed during inclement weather. New concrete should be allowed to cure and dry for at least 7 days of good drying weather. For each day of rain that occurs during that period, an additional day should be added to the 7-day drying time. For "Fasttrack" or high early concrete mixes, please contact your Dow Corning Technical Service Representative.

The sealant bead should be recessed below the pavement surface to prevent abrasion from traffic and snow removal equipment.

The adhesion to substrates other than Portland Cement Concrete should be checked before performing full-scale sealing. Contact your Dow Corning Technical Service Representative.

## HOW TO USE

Low-modulus DOW CORNING 888 silicone joint sealant easily withstands extreme joint movement when properly applied. The sealant will withstand 100 percent extension and 50 percent compression of the original joint width. However, the recommended joint movement design is for  $\pm 25$  percent (50 percent total) and not at the sealant limits. This difference ensures a successful seal when job site joint widths are different than designed widths. Therefore, the joint design dimensions should be less than the ultimate sealant capability.

A thin bead of silicone sealant will accommodate more movement than a thick bead. DOW CORNING 888 silicone joint sealant should be no thicker than 1/2 inch (12.7 mm) and no thinner than 1/4 inch (6.4 mm). Within these limits, the sealant width-to-depth ratio should be 2:1.

In all cases, the sealant must be recessed below the pavement surface at least 1/4 inch with 1/2 inch recess being acceptable in wider joints (see Table I). Consideration should also be given to other possible road-working operations, such as diamond-grinding of the surface. Activities of this type would require the sealant bead to be recessed even deeper.

DOW CORNING 888 silicone joint sealant is a nonsag sealant. This allows its use in vertical curb joints as well as horizontal joints.

**TABLE I: RECOMMENDED BACKER ROD INSTALLATION (SHALLOW CUT)<sup>1</sup>**

Joint Width	1/4"	3/8"	1/2"	3/4"	1"
Recessed Below Surface	1/4"	1/4"	1/4"	1/4"	1/2"
Sealant Thickness	1/4"	1/4"	1/4"	3/8"	1/2"
Backer Rod Diameter	3/8"	1/2"	5/8"	7/8"	1 1/4"
Total Joint Depth	7/8-1"	1-1 1/8"	1 1/8-1 1/4"	1 1/2-1 5/8"	2 1/4-2 3/8"

<sup>1</sup>On road surfaces where grinding is planned at a later date, the sealant and backer rod should be installed so that sealant is approximately 1/4 inch below the road surface after grinding is complete. An additional small amount should be added to allow for surface imperfections on the bottom and to provide room for old sealant to pump up from below during rehabilitation work in the summer months.

Being a non-leveling sealant, DOW CORNING 888 silicone joint sealant must be "tooled" to ensure good contact and adhesion as well as to control sealant depth and provide a recessed surface. Several devices can be used for tooling. Among the simplest and easiest to obtain is the expanded closed-cell polyethylene foam backer rod, which must be larger than the joint width.

In new construction where the joint is a new cut, a shallow cut is recommended where the backer rod is

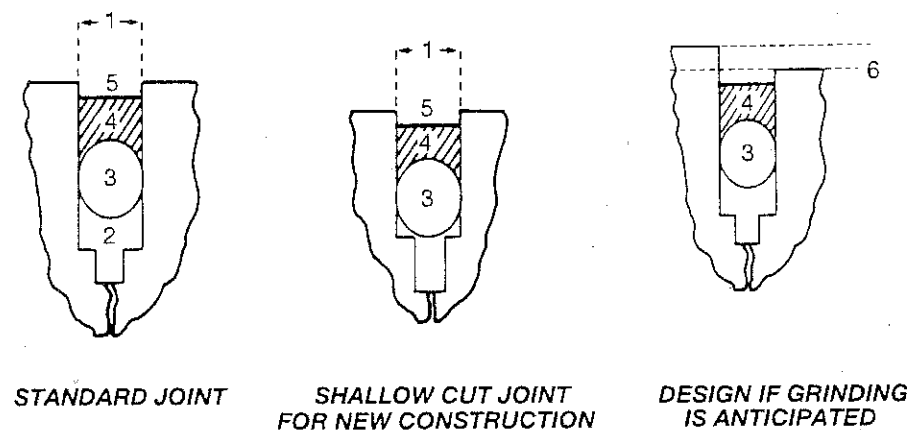
placed on the "shelf" or bottom of the joint (see Figure I). Recommended depths are shown in Table I. This design provides a firm support for sealant tooling, making the sealant easier to install, and further ensures good sealant/concrete contact. A shallow cut design also saves saw blades and time.

In repair work where previous sealing materials have been of a joint filling type rather than a joint sealing type, or where the joint is not broadened by sawing, a standard joint design is

recommended in which the backer rod is slightly above the shelf. Extra space (1/4 inch to 1/2 inch) between the bottom of the backer rod and shelf should be provided to allow for possible "pumping" of old joint filling material from the bottom of the joint. It is recommended that care be given to selection of proper oversized backer, so that a firm tooling support is obtained (generally 1/4 inch larger than the joint works quite well).

DOW CORNING 888 silicone joint sealant is part of a system that must include the proper backer rod and proper installation procedures. The backer rod must be expanded closed-cell polyethylene foam. Where irregularly shaped joints exist, backer rod that is open-cell with an impervious skin is recommended to ensure a tight fit. Several other back-up materials (paper, fibrous ropes and open cell foam) are available, but have proven to be unacceptable. There are several manufacturers of closed-cell polyethylene foam and any may be used.

Table I shows proper backer rod size for various joint widths, based on closed-cell backer rod.

**FIGURE I: GOOD JOINT DESIGNS****STANDARD JOINT****SHALLOW CUT JOINT  
FOR NEW CONSTRUCTION****DESIGN IF GRINDING  
IS ANTICIPATED**

1. Joint width wide enough to accommodate movement. (For additional information on joint width, see papers by Spells and Klosowski, "Silicone Sealants for Use in Concrete Construction," Vol. 1, No. 1, *American Concrete Institute*, SP-70, 1981; J.B. Cook, "Construction Sealants and Adhesives," Wiley-Interscience, 1970; and J.M. Klosowski, "Sealants in Construction," Marcel Dekker, 1989).
2. Joint sawed deep enough to allow backer rod/sealant placement and space for pumping of old sealant compounds. NOTE: This applies to standard joints only; void space beneath backer rod in new construction is not needed.
3. Proper backer rod placement to prevent three-sided adhesion.
4. Sealant installed to proper depth and width.
5. Sealant tooled 1/4 inch to 1/2 inch below pavement surface.
6. Depth of lowest slab determines the amount of recess required if grinding is anticipated; once grinding is complete, the sealant will have proper recess below the pavement surface.

## INSTALLATION

When installing DOW CORNING 888 silicone joint sealant, it is critical to clean and dry the joint prior to and during installation. Several procedures have been used in the past. However, experience has shown that some are less reliable than others, apparently due to operator error and inadequate equipment maintenance. For this reason, water blasting, grinding, routing and wire brushing are no longer acceptable cleaning methods.

Instead, the following procedure is considered most reliable and is recommended for cleaning and drying the joint:

**TABLE II: JOINT REQUIREMENTS**

*Linear feet per gallon of DOW CORNING 888 silicone joint sealant for various joint widths.*

Joint Width, Inches	Sealant Bead Thickness, Inches	Minimum Joint Depth, Inches	Backer Rod Diameter, Inches	Backer Rod Placement Depth, Inches	Estimated Linear Feet/Gallon
1/4	1/4	1	3/8	1/2	246
3/8	1/4	1 1/4	1/2	1/2	149
1/2	1/4	1 1/2	5/8	1/2	103
5/8	5/16	1 1/2	3/4	9/16	66
3/4	3/8	1 3/4	1	7/8	46
7/8	7/16	1 7/8	1	11/16	33
1	1/2	2	1 1/4	3/4	26
>1	1/2	2+	1 1/2+	3/4	-

Volumes will vary depending on joint design, tooling, backer rod placement and waste, and are based on material needed to form an hour-glass shape, including the shoulders on top and bottom.

1. Clean all joints of contaminants and impurities to the depth at which the sealant and backer rod are to be installed. This may require cutting, immediately followed by flushing with water to remove residual laitance. Flushing should be done in only one direction (forward) to reduce recontamination of the joint faces. After drying, at least the top inch of each joint face must be sandblasted to ensure a sound, clean surface for sealant application.

Sandblasting should be performed in two passes (one for each joint face) with the nozzle held at an angle to the face and no more than 2 inches from it. Sandblasting should be performed in compliance with federal and local laws. Proper protective equipment must be worn.

2. Blow out the dust, loose particles and other debris from the joints in one direction only with oil- and water-free compressed air. Surfaces must be *clean, dry, frost-free and dust-free* and can be checked by running a finger along the joint face. If a white, chalky dust appears on the finger, the joint must be recleaned.

3. Install recommended backer rod in the joint. The backer rod permits application of the sealant at a controlled depth and acts as a bond breaker to allow the silicone sealant to stretch freely with joint movement. See Table I for the proper depth.

4. Apply DOW CORNING 888 silicone joint sealant in a continuous operation to properly fill and seal the joint width (see Table II). For maximum performance, the sealant should be applied at temperatures above 4.4 C (40 F). However, this material has been successfully installed at lower temperatures. This type of situation requires greater caution to ensure a clean, dry and frost-free joint and should be discussed with a Dow Corning representative before installation.

For optimum adhesion, new concrete must be allowed to cure and dry for a minimum of 7 good drying days prior to sealant installation. For each day of wet or rainy weather, an additional day of dry weather must be added to the drying period.

For "Fastrack" or high early concrete mixes please contact your Dow Corning Technical Service Representative.

5. Tool the joint so that it is concave and a minimum of 1/4 inch below the roadway surface to prevent traffic abrasion. Tooling should be done before a "skin" forms, usually within 10 minutes of application. Do not use soap, water or oil as a tooling aid (see Figure I).

6. Excess sealant may be cleaned from tools and equipment while in an uncured state with a commercial solvent such as xylol or a high-flash

solvent. Use appropriate precautions with regard to fire hazards and eye and skin contact. (Use goggles and gloves, if needed.)

7. Joints that have been properly recessed may be opened to traffic as soon as the installation equipment can be cleared from the traffic lane.

NOTE: For complete installation instructions, see the DOW CORNING Silicone Pavement Sealant Guide, Form No. 61-507.

#### CAUTION

Before handling sealant, read product and material safety data sheets for detailed use and health information.

Direct contact with uncured sealant may irritate eyes slightly. Avoid eye contact. Do not handle contact lenses with sealant on hands. In case of eye contact, flush eyes with water for 15 minutes.

Uncured sealant may cause injury if swallowed in large amounts. Do not put in mouth. If swallowed, obtain immediate medical attention.

Toxicology studies indicate that repeated, prolonged over-exposure to N-MA causes adverse reproductive effects in laboratory animals. Avoid breathing vapors. Do not use in poorly ventilated spaces. Avoid prolonged skin contact.

KEEP OUT OF REACH OF CHILDREN.

## SHIPPING LIMITATIONS

None.

## STORAGE AND SHELF LIFE

When stored in original, unopened containers at or below 32 C (90 F), DOW CORNING 888 silicone joint sealant has a shelf life of 6 months from date of shipment. Keep containers tightly closed.

## PACKAGING

DOW CORNING 888 silicone joint sealant is supplied in 29-fl oz (857-mL) disposable plastic cartridges, 4.5-gal (17-L) bulk pails, and 40-gal (151.4-L) bulk drums.

## MSDS INFORMATION

ATTENTION: PRODUCT SAFETY INFORMATION REQUIRED FOR

SAFE USE IS NOT INCLUDED BEFORE HANDLING. READ PRODUCT AND MATERIAL SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE MATERIAL SAFETY DATA SHEET IS AVAILABLE FROM YOUR DOW CORNING REPRESENTATIVE, OR DISTRIBUTOR, OR BY WRITING TO DOW CORNING CUSTOMER SERVICE, OR BY CALLING (517) 496-6000.

## WARRANTY INFORMATION - PLEASE READ CAREFULLY

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